Final
Site-Specific Field Sampling Plan, Site-Specific Safety and Health Plan, and Site-Specific Unexploded Ordnance Safety Plan Attachments Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q

Fort McClellan
Calhoun County, Alabama

Task Order CK10
Contract No. DACA21-96-D-0018
IT Project No. 796887

June 2001

Revision 0

Final
Site-Specific Field Sampling Plan Attachment
Site Investigation at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q

Fort McClellan
Calhoun County, Alabama

Prepared for:

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Task Order CK10
Contract No. DACA21-96-D-0018
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June 2001

Revision 0

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Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation (IT) will conduct site investigation activities at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, at Fort McClellan, Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals (PSSC) at this site. The purpose of this site-specific field sampling plan (SFSP) is to provide technical guidance for sampling activities at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q.

Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, are located in the east-central area of the Main Post of FTMC. Parcels 224Q, 226Q, and 227Q are the primary ranges of concern for the area of investigation as defined in the environmental baseline survey (EBS). The inherent impact areas of some of the ranges extend beyond the area of investigation for this SI, but will be included in the Baby Bains Gap Road engineering evaluation/cost analysis (EE/CA) investigation that will include Ranges 20, 23, 25, 26, and 29. The area surrounding the area of investigation for Parcels 224Q, 226Q, and 227Q on the north, east and south will be investigated in the Baby Bains Gap Road EE/CA.

Parcel 224Q was identified on the 1937 General Map of FTMC as a pistol range south of Range 25. The surface danger zone, or range fan, was not identified for Parcel 224Q, and the direction of fire is unknown. The firing direction for the range was likely to the east or to the south and is probably within the study area for this SI. A berm extends northeast-southwest across the western boundary of the parcel. This berm may have been the backstop for the range. The impact area would not likely be to the north because of the location of Range 25, which dates back to 1937. Also, the direction of fire would not likely be to the west toward the main cantonment.

Former Machine Gun Range, Parcel 226Q, is identified on the 1946 Reservation Map south of Range 25. The direction of fire, based on the range fan presented in the EBS, was to the southeast. The 1946 Reservation Map is the only documentation of this range. The parcel

boundary extends in a fan shape to the southeast toward current Range 23. There is not any other information available regarding this range, dates of use, or operation.

Former Pistol Range, Parcel 227Q, also is identified on the 1946 Reservation Map as Range 23. The direction of fire was nearly due east, according to Figure 2 of the EBS. Pistol ranges are identified in this general area on other maps, according to the EBS. Aerial photographs from 1944 show the area for the firing line as a rectangular-shaped clearing on the western end of the parcel. Ingram Creek transects Former Pistol Range, Parcel 227Q, flowing to the northwest. The parcel boundary extends in a fan shape to the east toward Range 23. The impact area for Parcel 226Q, as shown in Figure 2 of the EBS, appears to be to the southeast, beyond the study area for this SI and in the impact area for recent Range 23 and the Baby Bains Gap Road EE/CA study area. There is not any other information available regarding this range or its operation.

In addition to the Parcels 224Q, 226Q, and 227Q described in the EBS for the study area, ten other ranges (areas) were shown on Plates 4, 5, 6, and 10 of the U.S. Army Corps of Engineers July 1999 *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (ASR). These ranges were not described in the EBS or shown on any of the EBS figures. Most of the additional ranges shown on the ASR map plates in the study area are not described or named in the ASR.

Both the EBS-defined ranges (Parcels 224Q, 226Q, and 227Q) and the ten range shapes shown on the ASR plates within this study area will be investigated. Impact areas outside the study area for this SI will be investigated as part of the Baby Bains Gap Road EE/CA.

Specifically, IT will collect 35 surface soil samples, 32 subsurface soil samples, 13 groundwater samples, 16 surface water samples, and 16 sediment samples at this site. Potential contaminant sources at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, are primarily unknown but may include nitroexplosives and lead. Chemical analyses of the samples collected during the field program will include nitroexplosives and metals. In addition, sediment samples will be analyzed for total organic carbon and grain size. Results from these analyses will be compared with site-specific screening levels and ecological screening values presented in the IT July 2000 *Final Human Health and Ecological Screening Values and PAH Background Summary Report,* and regulatory agency guidelines.

Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, fall within the "Possible Artillery Impact Areas" shown on Plate 10 of the ASR. Therefore, unexploded ordnance (UXO) surface sweeps and downhole surveys of soil borings will be required to support field activities at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance.

The U.S. Army Corps of Engineers-Huntsville Center of Excellence is conducting separate investigations at Fort McClellan to determine the presence or absence of unexploded ordnance (UXO). Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q and Former Pistol Range, Parcel 227Q will be investigated for use as part of the Bravo Area EE/CA investigation which began in April 2001.

This SFSP attachment to the installation-wide sampling and analysis plan (SAP) for Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, will be used in conjunction with the site-specific safety and health plan, the site specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management plan, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan.

1.0 Project Description

1.1 Introduction

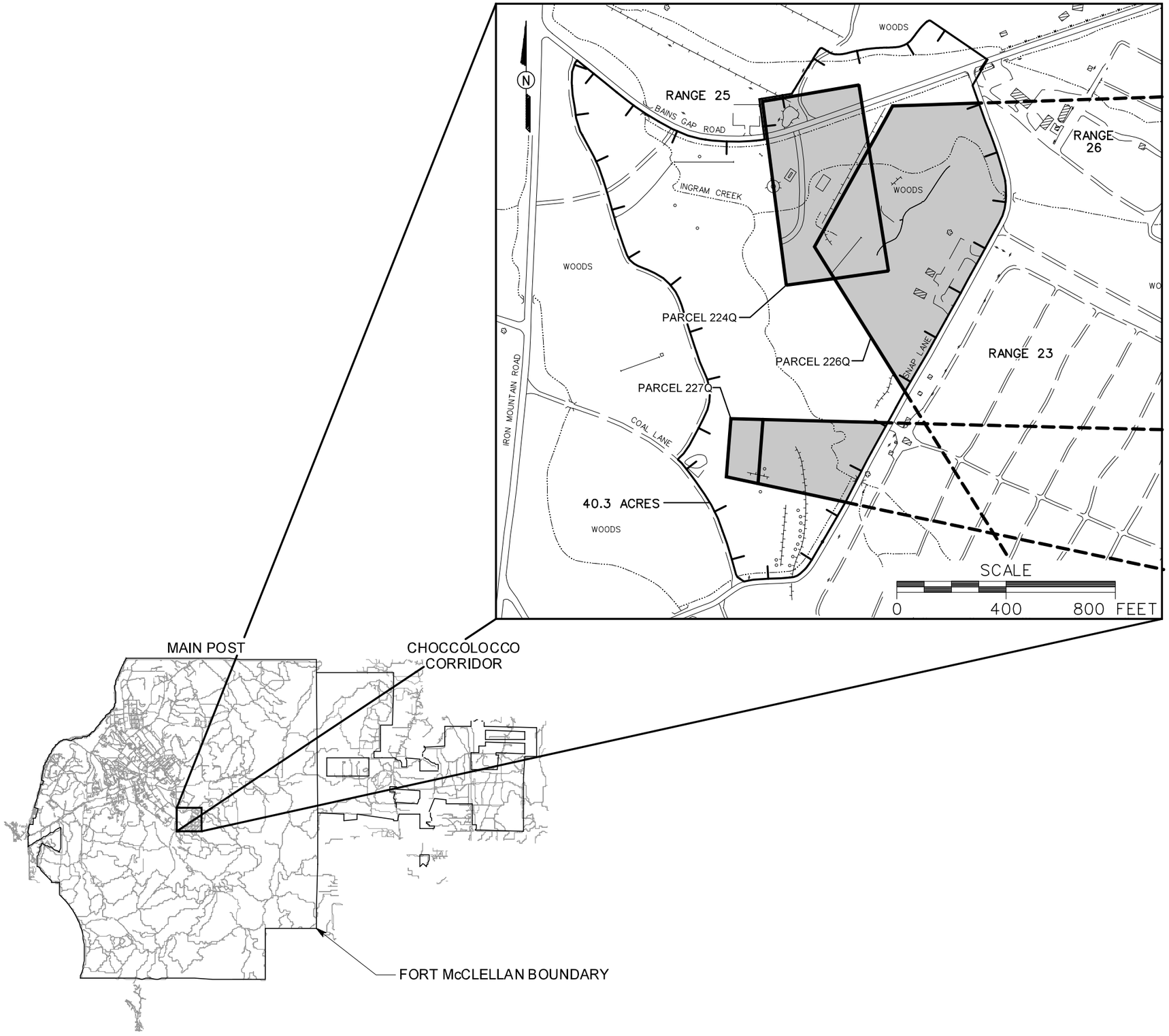
The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, under Task Order CK10, Contract Number DACA21-96-D-0018.

This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) (IT, 2000a) for FTMC has been prepared to provide technical guidance for sample collection and analysis at an area of investigation encompassing portions of Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) and the site-specific unexploded ordnance (UXO) safety plan developed for Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, and the installation-wide work plan (WP) (IT, 1998) and SAP. The SAP includes the installation-wide safety and health plan (SHP), waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP.

1.2 Site Description

Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, are located in the east-central area of the Main Post of FTMC (Figure 1-1). The area for this investigation is shown on Figure 1-2. Parcels 224Q, 226Q, and 227Q are the primary ranges of concern for the area of investigation as defined in the environmental baseline survey (EBS) (ESE, 1998). The inherent impact areas of the ranges extend beyond the area of investigation for this SI, but will be included in the Baby Bains Gap Road engineering evaluation/cost analysis (EE/CA) investigation that will include Ranges 20, 23, 25, 26, and 29 (Figure 1-2).

Parcel 224Q was identified on the 1937 General Map of FTMC as a pistol range south of Range 25 (Figure 1-2) (ESE, 1998). The surface danger zone, or range fan, was not identified for Parcel



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- FORMER BUILDING
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- UTILITY POLE
- BERM / MOUND
- DEPRESSION
- AREA OF INVESTIGATION (40.3 ACRES)

FIGURE 1-1
SITE LOCATION MAP
FORMER PISTOL RANGE SOUTH OF RANGE 25, PARCEL 224Q
FORMER MACHINE GUN RANGE
PARCEL 226Q
FORMER PISTOL RANGE
PARCEL 227Q

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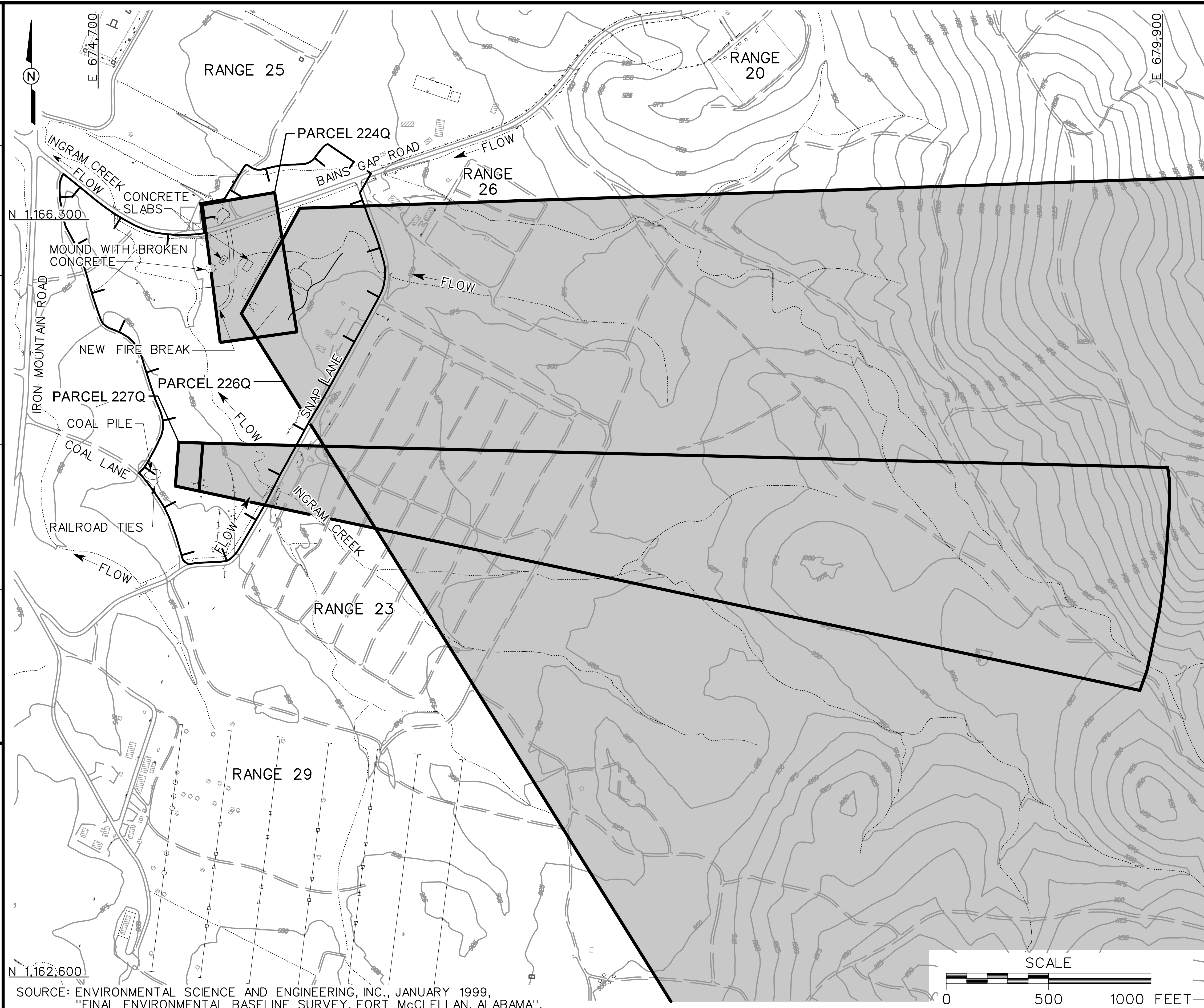

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 25 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- UTILITY POLE
- BERM / MOUND
- DEPRESSION
- TRENCH
- AREA OF INVESTIGATION

FIGURE 1-2
SITE MAP
FORMER PISTOL RANGE SOUTH OF RANGE 25, PARCEL 224Q
FORMER MACHINE GUN RANGE PARCEL 226Q
FORMER PISTOL RANGE PARCEL 227Q

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224Q, and the direction of fire is unknown. The firing direction for the range was likely to the east or to the south and the impact area is probably within the study area for this SI. There is a berm that runs northeast-southwest across the western boundary of the parcel. This berm may have been the backstop for the range. The impact area would not likely be to the north because of the location of Range 25, which dates back to 1937 (ESE, 1998). Also, the direction of fire would not likely be to the west toward the main cantonment.

The parcel boundary is approximately 375 feet by 675 feet (ESE, 1998). From aerial photographs taken in 1944, Former Pistol Range South of Range 25 appears as a large clearing surrounded by sparse ground vegetation. Bains Gap Road runs east to west along the northern portion of the parcel, and a tributary of Ingram Creek transects the center of the parcel, flowing west-northwest. The overall elevation of Former Pistol Range, Parcel 224Q, ranges from approximately 825 to 845 feet above mean sea level (msl). Ground surface slopes to the northwest. There is not any other information available regarding this range for dates of use or operation activities (ESE, 1998).

Former Machine Gun Range, Parcel 226Q, is identified on the 1946 Reservation Map south of Range 25 (Figure 1-2). The direction of fire, based on the range fan presented in the EBS, was to the southeast (ESE, 1998). The 1946 Reservation Map is the only documentation of this range (ESE, 1998). The parcel boundary extends in a fan shape to the southeast toward current Range 23. The elevation of Former Machine Gun Range, Parcel 226Q, ranges from approximately 830 to 860 feet above msl in the study area. The impact area for Parcel 226Q as shown in Figure 2 of the EBS appears to be to the southeast, beyond this SI study area and in the impact area for recent Range 23 (ESE, 1998) (Figure 1-2). There is not any other information available regarding this range, dates of use, or operation (ESE, 1998).

Former Pistol Range, Parcel 227Q, also is identified on the 1946 Reservation Map as Range 23 (Figure 1-2) (ESE, 1998). The direction of fire was nearly due east, according to Figure 2 of the EBS. Pistol ranges are identified in this general area on other maps (ESE, 1998). Aerial photographs from 1944 show the firing line area as a rectangular-shaped clearing on the western end of the parcel. Ingram Creek transects Former Pistol Range, Parcel 227Q, flowing to the northwest. The parcel boundary extends to the east toward Range 23, in a fan shape. The elevation of Former Pistol Range, Parcel 227Q, ranges from approximately 840 to 870 feet above msl in the study area. The impact area for Parcel 226Q, as shown in Figure 2 of the EBS, appears to be to the southeast, beyond the study area for this SI and in the impact area for recent

Range 23 and the Baby Bains Gap Road EE/CA study area (ESE, 1998). There is not any other information available regarding this range or its operation (ESE, 1998).

During site walks conducted by IT personnel in March and June 2001, several surface features were noted. Most of the areas of investigation are densely wooded. Along the former firing line for Former Machine Gun Range, Parcel 226Q, was a firing berm, approximately 10 to 18 feet wide, with 3-foot pipes and railroad ties running the length. This berm appears more like a firing line than an impact area. The berm may have been the firing line for Former Machine Gun Range, Parcel 226Q. A new firebreak extends south from Bains Gap Road midway through Parcel 224Q and turns west towards Ingram Creek. Also noted were two concrete slabs; one measured 24 feet by 36 feet, and the other measured 25 feet by 36 feet with a block foundation. A mound with broken concrete was located about 50 feet to west of the second concrete slab. There is a 12-foot by 4-foot trench on the west side of Parcel 224Q.

A large bare area with small arms fragmentation and lead on the ground surface is in the center of the probable firing area for Parcel 226Q, just east of Parcel 224Q. Just southwest of this bare area, there is a single metal rail extending in a curved shape that was possibly used to maneuver small arms targets. Just to the southwest of the bare area is a long natural embankment that appears to have been used as an impact area.

There are two low north-south berms or linear mounds south of Parcel 227Q. The longer berm extends across Snap Lane. There are numerous shallow depressions and shallow trenches throughout the area of investigation that may have been used for defensive position training. From observations during the site walk, it appeared that the area of investigation had been used in recent years for a bivouac or defensive training area rather than for range fire activities.

In addition to the Parcels 224Q, 226Q, and 227Q described in the EBS for the study area, ten other ranges (areas) were shown on Plates 4, 5, 6, and 10 of the U.S. Army Corps of Engineers *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (ASR) (USACE, 1999a). These ranges were not described in the EBS. Figures 1-3, 1-4, 1-5, and 1-6, taken from the ASR map plates, show the additional ranges were present in the study area between the years of Inter-War use (Plate 4) through 1973 (Plate 6). Most of the ranges are not named or described in the ASR. Each of the plates in the ASR represents a different time period of range use at Fort McClellan. Time periods for the ASR plates that show additional ranges in this area of investigation are as follows:

DRAFT. CHCK. BY:
ENGR. CHCK. BY: J. RAGSDALE
PROJ. MGR.: J. YACOUB
INITIATOR: L. O'HARE
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RANGE 25

INGRAM CREEK FLOW

MOUND OF DEBRIS

NEW FIRE BREAK

FLOW

12'x4' TRENCH

MOUND WITH BROKEN CONCRETE

BAINS GAP ROAD

CONCRETE SLABS

C

RAILROAD CROSS TIES AND STEEL RAILS ARE PLACED ALONG THE BERM

RANGE 26

CLEAR AREA WITH SMALL ARMS FRAGMENTATION (LEAD)

TWO EMPTY RUSTED 55-GALLON DRUMS

SINGLE METAL RAIL POSSIBLY USED TO MANEUVER SMALL ARMS TARGETS

NATURAL EMBANKMENT USED AS IMPACT AREA

B
(PISTOL RANGE)

PARCEL 226Q

PARCEL 224Q

PARCEL 227Q

SNAP LANE

COAL LANE

IRON MOUNTAIN ROAD

COAL PILE

RAILROAD TIES

SMALL DEPRESSIONS

A
(FORMER RANGE 23)

RANGE 23

RANGE 29

INGRAM CREEK FLOW

825 850 875 900

N 1,164,000

SOURCE: PLATE 4 OF "ARCHIVE SEARCH REPORT, MAPS, FORT McCLELLAN, ANNISTON, ALABAMA", USACE, JULY 1999.

SCALE
0 300 600 FEET

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- UTILITY POLE
- BERM / MOUND
- DEPRESSION
- TRENCH
- AREA OF INVESTIGATION

FIGURE 1-3
ASR PLATE 4 SITE MAP
FORMER PISTOL RANGE SOUTH OF RANGE 25, PARCEL 224Q
FORMER MACHINE GUN RANGE PARCEL 226Q
FORMER PISTOL RANGE PARCEL 227Q

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E 676,500

RANGE 25

RANGE 26

RANGE 23

INGRAM CREEK FLOW

BAINS GAP ROAD

MOUND OF DEBRIS

NEW FIRE BREAK

FLOW

12'x4' TRENCH

CONCRETE SLABS

RAILROAD CROSS TIES AND STEEL RAILS ARE PLACED ALONG THE BERM

CLEAR AREA WITH SMALL ARMS FRAGMENTATION (LEAD)

MOUND WITH BROKEN CONCRETE

SINGLE METAL RAIL POSSIBLY USED TO MANEUVER SMALL ARMS TARGETS

TWO EMPTY RUSTED 55-GALLON DRUMS

NATURAL EMBANKMENT USED AS IMPACT AREA

PARCEL 224Q

PARCEL 226Q

PARCEL 227Q

SNAP LANE

COAL LANE

IRON MOUNTAIN ROAD

COAL PILE

RAILROAD TIES

SMALL DEPRESSIONS

INGRAM CREEK FLOW

825 850 875 900

D E F

N 1,164,000

SOURCE: PLATE 5 OF "ARCHIVE SEARCH REPORT, MAPS, FORT McCLELLAN, ANNISTON, ALABAMA", USACE, JULY 1999.

SCALE

0 300 600 FEET

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- UTILITY POLE
- BERM / MOUND
- DEPRESSION
- TRENCH
- AREA OF INVESTIGATION

FIGURE 1-4
ASR PLATE 5 SITE MAP
FORMER PISTOL RANGE SOUTH OF RANGE 25, PARCEL 224Q
FORMER MACHINE GUN RANGE
PARCEL 226Q
FORMER PISTOL RANGE
PARCEL 227Q

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N

N 1,166,300

E 674,500

E 676,500

RANGE 25

RANGE 26

RANGE 23

RANGE 29

INGRAM CREEK

FLOW

BAINS GAP ROAD

MOUND OF DEBRIS

NEW FIRE BREAK

CONCRETE SLABS

RAILROAD CROSS TIES AND STEEL RAILS ARE PLACED ALONG THE BERM

12'x4' TRENCH

CLEAR AREA WITH SMALL ARMS FRAGMENTATION (LEAD)

MOUND WITH BROKEN CONCRETE

SINGLE METAL RAIL POSSIBLY USED TO MANEUVER SMALL ARMS TARGETS

TWO EMPTY RUSTED 55-GALLON DRUMS

NATURAL EMBANKMENT USED AS IMPACT AREA

PARCEL 224Q

PARCEL 226Q

PARCEL 227Q

SNAP LANE

COAL LANE

IRON MOUNTAIN ROAD

COAL PILE

RAILROAD TIES

SMALL DEPRESSIONS

G

H

I

825

850

875

900

N 1,164,000

SOURCE: PLATE 6 OF "ARCHIVE SEARCH REPORT, MAPS, FORT McCLELLAN, ANNISTON, ALABAMA", USACE, JULY 1999.

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- UTILITY POLE
- BERM / MOUND
- DEPRESSION
- TRENCH
- AREA OF INVESTIGATION

SCALE

0 300 600 FEET

FIGURE 1-5
ASR PLATE 6 SITE MAP
FORMER PISTOL RANGE SOUTH OF RANGE 25, PARCEL 224Q
FORMER MACHINE GUN RANGE PARCEL 226Q
FORMER PISTOL RANGE PARCEL 227Q

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N

N 1,166,300

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E 676,500

RANGE 25

RANGE 26

RANGE 23

INGRAM CREEK FLOW

BAINS GAP ROAD

MOUND OF DEBRIS

NEW FIRE BREAK

12'x4' TRENCH

CONCRETE SLABS

C

RAILROAD CROSS TIES AND STEEL RAILS ARE PLACED ALONG THE BERM

CLEAR AREA WITH SMALL ARMS FRAGMENTATION (LEAD)

MOUND WITH BROKEN CONCRETE

TWO EMPTY RUSTED 55-GALLON DRUMS

SINGLE METAL RAIL POSSIBLY USED TO MANEUVER SMALL ARMS TARGETS

NATURAL EMBANKMENT USED AS IMPACT AREA

B
(PISTOL RANGE)

PARCEL 226Q

PARCEL 224Q

J

SNAP LANE

COAL LANE

IRON MOUNTAIN ROAD

COAL PILE

RAILROAD TIES

PARCEL 227Q

INGRAM CREEK FLOW

SMALL DEPRESSIONS

A
(FORMER RANGE 23)

N 1,164,000

825 850 875 900

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- UTILITY POLE
- BERM / MOUND
- DEPRESSION
- TRENCH
- AREA OF INVESTIGATION

SOURCE: PLATE 10 OF "ARCHIVE SEARCH REPORT, MAPS, FORT McCLELLAN, ANNISTON, ALABAMA", USACE, JULY 1999.

SCALE
0 300 600 FEET

FIGURE 1-6
ASR PLATE 10 SITE MAP
FORMER PISTOL RANGE SOUTH OF RANGE 25, PARCEL 224Q
FORMER MACHINE GUN RANGE
PARCEL 226Q
FORMER PISTOL RANGE
PARCEL 227Q

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- Plate 4 – Inter-War Range Use (World War I to World War II)
- Plate 5 – World War II to 1950 Range Use
- Plate 6 – 1950 to 1973 Range Use
- Plate 10 – Cumulative Map of All Ranges.

Table 1-1 presents a range location description matrix for each of the EBS and ASR ranges. Each of the ranges and impact areas is briefly described in Table 1-1, along with the number of the figure presented in this SFSP that shows the range.

The following provides brief descriptions of each of the ranges found in the ASR plates that show the historic ranges within the same area as Parcels 224Q, 226Q, and 227Q. The text below includes observations noted from each plate that include suspected impact area locations, types of ranges, and any other features noted.

Plate 4 of the ASR. Plate 4 of the ASR shows three ranges in the study area for this SI. Former Range 23 (A) appears to be an early orientation of Range 23 that extends on both the north and south sides of Snap Lane (Figure 1-3). According to the ASR, Former Range 23 (A) began in the Inter-War period as a pistol range and later changed to rifle and machine gun ranges. Range maps indicate that the Range 23 layout has changed often with different orientations, and the orientation of Range 23 (A) on Plate 4 appears to be further northwest than the recent Range 23 location. The impact area, due to the orientation of the range area shape shown on Figure 2 of the EBS, may be partially within the study area for this SI, but also may extend across Snap Lane into Range 23. Any impact area existing within Range 23 will be part of the Baby Bains Gap Road EE/CA. Also, the firing direction would not have been north toward Range 25 or west toward the main cantonment.

Unnamed Range B in the study area shown on Plate 4 of the ASR is labeled as a pistol range. Unnamed Parcel B is oriented northeast-southwest overlapping the upper portion of Parcel 224Q. The firing direction would have been to the southeast or to the southwest. The impact area may likely be along the southeast border toward the existing berm and within the study area for this SI.

Unnamed Range C shown on Plate 4 of the ASR is east of and somewhat parallel to Parcel 224Q. The range is oriented north-northwest to south-southeast. The firing direction would have been to the east or to the south. The impact area may likely be along the southern or eastern border of

Table 1-1

Range Description and Figure Location Matrix
Parcels 224Q, 226Q, and 227Q
Fort McClellan, Calhoun County, Alabama

Range Name	Parcel Number	Site Description	Figure 1-2 EBS[a]	Figure 1-3 Plate 4[b]	Figure 1-4 Plate 5[b]	Figure 1-5 Plate 6[b]	Figure 1-6 Plate 10[b]	Impact Area Location
Former Pistol Range South of Range 25	224Q	The EBS states the 1937 General Map of Fort McClellan identifies a pistol range south of Range 25 assigned as Parcel 224Q. The surface danger zone was not identified and the direction of fire is not known, but is likely toward the east or south.	X					The impact area appears to be toward the southern portion of the parcel and within the study area for this SI.
Former Machine Gun Range	226Q	The EBS states the 1946 Reservation Map (U.S. Engineer Office, Mobile, AL, 1946) identifies a Machine Gun Range south of Range 25 assigned as Parcel 226Q. The direction of fire at this range was to the southeast.	X					The impact area appears to be to the east of the study area toward Ranges 23 and 26 in the Baby Bains Gap Road EE/CA study area.
Former Pistol Range	227Q	The EBS states the Former Pistol Range, Parcel 227Q, is located in the east-central area of the Main Post. The 1946 Reservation Map identifies a Pistol Range at Range 23. The direction of fire at this range was nearly due east.	X					The impact area appears to be to the east of the study area toward Range 23 in the Baby Bains Gap Road EE/CA study area.
Former Range 23 (A)[C]	NA	According to the ASR, Former Range 23 (A) history starts in the Inter-War period as a pistol range and changes to rifle and machine gun use. Maps indicate the range layout has changed often with different orientations and Former Range 23 appears to be further northwest than the recent Range 23 location.		X			X	The impact area during the Inter-War period for former Range 23 (A) appears to be in the southeast portion of the range in the study area and/or within the recent Range 23 area which will be part of the Baby Bains Gap Road EE/CA study area.
Pistol Range B	NA	This range shape is labeled as a pistol range on Plate 4 of the ASR. Pistol Range B is oriented northeast-southwest overlapping the upper portion of Parcel 224Q.		X			X	The firing direction would have been to the southeast or to the southwest. The impact area may likely be along the southeast border toward the existing berm and within the study area for this SI.

Table 1-1

Range Description and Figure Location Matrix
Parcels 224Q, 226Q, and 227Q
Fort McClellan, Calhoun County, Alabama

Range Name	Parcel Number	Site Description	Figure 1-2 EBS[a]	Figure 1-3 Plate 4[b]	Figure 1-4 Plate 5[b]	Figure 1-5 Plate 6[b]	Figure 1-6 Plate 10[b]	Impact Area Location
Unnamed Range C	NA	Unnamed Range C is east and somewhat parallel of Parcel 224Q, and is oriented north-northwest to south-southeast.		X			X	The firing direction would have been to the east or to the south. The impact area may likely be along the southern or eastern border of the parcel within the eastern boundary of the study area for this SI or across Snap Lane into Range 26 which is part of the Baby Bains Gap EE/CA study area.
Unnamed Range D	NA	Unnamed Range D overlaps Parcel 224Q on the east and is oriented northeast to southwest.			X			The impact area appears to be to the southwest portion of the range area and within the study area for this SI.
Unnamed Range E	NA	Unnamed Range E is almost parallel to Unnamed Range D and overlaps the southwest corner of Parcel 224Q. Unnamed Range E is somewhat larger than Unnamed Range D and is oriented northeast to southwest.			X			The impact area appears to be to the southwest portion of the range area and within the study area for this SI.
Unnamed Range F	NA	Unnamed Range F is oriented west to east. Plate 5 of the ASR appears to show a firing line area as well as the range fan that overlaps the range fan for Parcel 227Q. Unnamed Range F, on Plate 5 of the ASR, may be intended to represent Parcel 227Q.			X			The impact area appears to be to the east across Snap Lane in the area of Range 23 and the Baby Bains Gap Road EE/CA.
Unnamed Range G	NA	Unnamed Range G is oriented northwest to southeast. Plate 6 of the ASR appears to show a firing line area and the range fan close to the same location as Parcel 226Q. Also, the firing line for this range overlaps Parcel 224Q.				X		The impact area appears be to the east toward Ranges 23 and 26 in the study area for the Baby Bains Gap Road EE/CA.
Unnamed Range H	NA	Unnamed Range H is oriented mostly west to east. Plate 6 of the ASR shows the range fan over twice as large as Parcel 227Q and covers the range fan for Parcel 227Q. This range fan may be intended to represent Parcel 227Q.				X		The impact area appears be to the east toward Range 23 and the Baby Bains Gap Road EE/CA study area.

Table 1-1

Range Description and Figure Location Matrix
Parcels 224Q, 226Q, and 227Q
Fort McClellan, Calhoun County, Alabama

Range Name	Parcel Number	Site Description	Figure 1-2 EBS[a]	Figure 1-3 Plate 4[b]	Figure 1-4 Plate 5[b]	Figure 1-5 Plate 6[b]	Figure 1-6 Plate 10[b]	Impact Area Location
Unnamed Range I	NA	Unnamed Range I is located to the south of Unnamed Range H and is oriented mostly west to east. Plate 6 of the ASR shows the range fan for I almost parallel to Unnamed Range H.				X		The impact area appears be to the east toward Range 23 and the Baby Bains Gap Road EE/CA study area.
Unnamed Range J	NA	Unnamed Range J is located in the same area as the firing line area for EBS Parcel 224Q. Only Plate 10 of the ASR shows this range area and it almost matches the firing line for EBS Parcel 227Q . This range area in the ASR may be intended to represent the firing line for Parcel 227Q.					X	The impact area for this range area is likely toward Snap Lane within the southern portion of the study area. However, if it is intended to represent Parcel 227Q, the impact area will be to the east into Range 23 and the Baby Bains Gap Road EE/CA study area.

[a] Ranges with assigned parcels numbers described in the Environmental Science and Engineering, Inc. January 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama.***

[b] Corresponds to the Map Plate Number from the July 1999 U.S. Army Corps of Engineers ***Archive Search Report, Maps, Fort McClellan, Anniston, Alabama.***

[c] Former Range 23 is identified by label OA-41 in the July 1999 U.S. Army Corps of Engineers Archive Search Report, Maps, Fort McClellan, Anniston, Alabama.

EBS-Final Environmental Baseline Survey.

NA - Not assigned a parcel number or described in the EBS.

ASR-July 1999 U.S. Army Corps of Engineers ***Archive Search Report, Maps, Fort McClellan, Anniston, Alabama.***

X - Denotes the figure where the listed range is shown in this SFSP. Figures 1-3, 1-4, 1-5, and 1-6 show historic ranges from the ASR plate number shown in relation to the EBS assigned parcels in the area of investigation.

Parcel 226Q within the eastern boundary of the study area for this SI, or across Snap Lane into Range 23 or Range 26, which is part of the Baby Bains Gap Road EE/CA study area.

Plate 5 of the ASR. Plate 5 of the ASR shows three unnamed ranges (D, E, and F) (Figure 1-4). Unnamed Range D overlaps Parcel 224Q on the east and is oriented northeast to southwest. Unnamed Range E is almost parallel to Unnamed Range D and overlaps the southwest corner of Parcel 224Q. Unnamed Range E is somewhat larger than Unnamed Range D and is also oriented northeast to southwest. Unnamed Range F is oriented west to east, similar to Parcel 227Q. Plate 5 of the ASR appears to show a firing line area as well as the range fan for Unnamed Range F that overlaps the range fan for Parcel 227Q and may be intended to represent Parcel 227Q. The impact area for Unnamed Ranges D and E may likely be in the southwest portion of the study area for this SI. The impact area for Unnamed Range F appears to be to the east across Snap Lane in the area of Range 23 and the Baby Bains Gap Road EE/CA (Figure 1-4).

Plate 6 of the ASR. Plate 6 of the ASR shows three unnamed ranges (G, H, and I) (Figure 1-5). Unnamed Range G is oriented northwest to southeast. Plate 6 appears to show the firing line area and the range fan in almost the same location as Parcel 226Q. The firing line for this range overlaps the southeastern corner of Parcel 224Q. Unnamed Range H fan is oriented west to east on Plate 6 of the ASR and appears to be about twice as large as Parcel 227Q. This range fan may be intended to represent Parcel 227Q. Unnamed Range I fan is located to the south of Unnamed Range H and is oriented west to east. Plate 6 of the ASR shows the range fan almost parallel to Unnamed Range H. The impact areas for all three of the ranges shown on Plate 6 of the ASR are in the area of Range 23 and in the Baby Bains Gap Road EE/CA.

Plate 10 of the ASR. Plate 10 of the ASR is the cumulative map of all ranges; however, only unnamed range areas A, B, and C (from the ASR Plates 4, 5, and 6) are shown on Plate 10 (Figure 1-6). Plate 10 shows an unnamed range area (J) not shown on the previous ASR plates. This range shape appears similar to the firing line area for Parcel 227Q, but there is not a range fan shown. There is not any other information available for this range shape. The impact area for this range area is likely to the east toward Snap Lane within the southern portion of the study area. However, if it is intended to represent Parcel 227Q, the impact area will be toward Range 23 and the Baby Bains Gap Road EE/CA study area.

Aerial Photographs. Available aerial photographs were reviewed to reveal any land use activity in the study area, and attempts were made to match the review of the photographs to the

FTMC range use records in the ASR. The following is a summary of the review of the available aerial photographs for this study area:

1937. This aerial photograph shows most of the study area which appears to be fully wooded, except for an active area in the vicinity of Parcel 224Q. A long, wide, bare strip, indicating heavy activity, extends the full length of the range shape for Parcel 224Q. Due to lack of photo clarity, it is difficult to discern if any range activity was being conducted east of Parcel 224Q in the area of Parcel 226Q. The land in the area of the probable firing line for 226Q is clear of trees, and there appear to be some roads across the area.

There does not appear to be any activity in the vicinity of Parcel 227Q. The only two ranges shown on the ASR Plate 4 for this time period that would possibly match the active areas shown on the 1937 aerial photograph are Unnamed Ranges A and C. It is obvious in the 1937 aerial photograph that Range 25 to the north of the study area was an active range.

1940. This aerial photograph is clearer than the 1937 photograph (Figure 1-7). There is not any obvious change to the study area for this year from the 1937 aerial photograph. Both the 1937 and 1940 aerial photographs were taken during the Inter-War Period of range use at FTMC, which Plate 4 of the ASR represents (Figure 1-3).

1944. This aerial photograph shows more activity in the study area and expanded land use in the area east of Parcel 224Q where the probable firing line area for Parcel 226Q would be (Figure 1-8). The activity appears more related to the area of Parcel 226Q than Parcel 224Q. Former Pistol Range, Parcel 224Q appears to be no longer in use. Also, there are two or three buildings observed in the center of Parcel 224Q, which may be for support activities for the range at Parcel 226Q. These building locations may correspond to the concrete slabs observed during the IT site walk in March 2001. Perpendicular berms or target lines down range of the probable firing line are observed in Parcel 226Q. These shapes also match the firing line area for Unnamed Range G shown on Plate 5 of the ASR (WWII to 1950 range use) in Figure 1-4.

There appears to be land use activity in the area that matches the probable firing line for Parcel 227Q in the area of Unnamed Range I (Figure 1-4).

1954. Land use activity shown in this aerial photograph is very similar to the 1944 photograph; however, the areas of use are more obvious (Figure 1-9). Unnamed Range H shown on Figure 1-

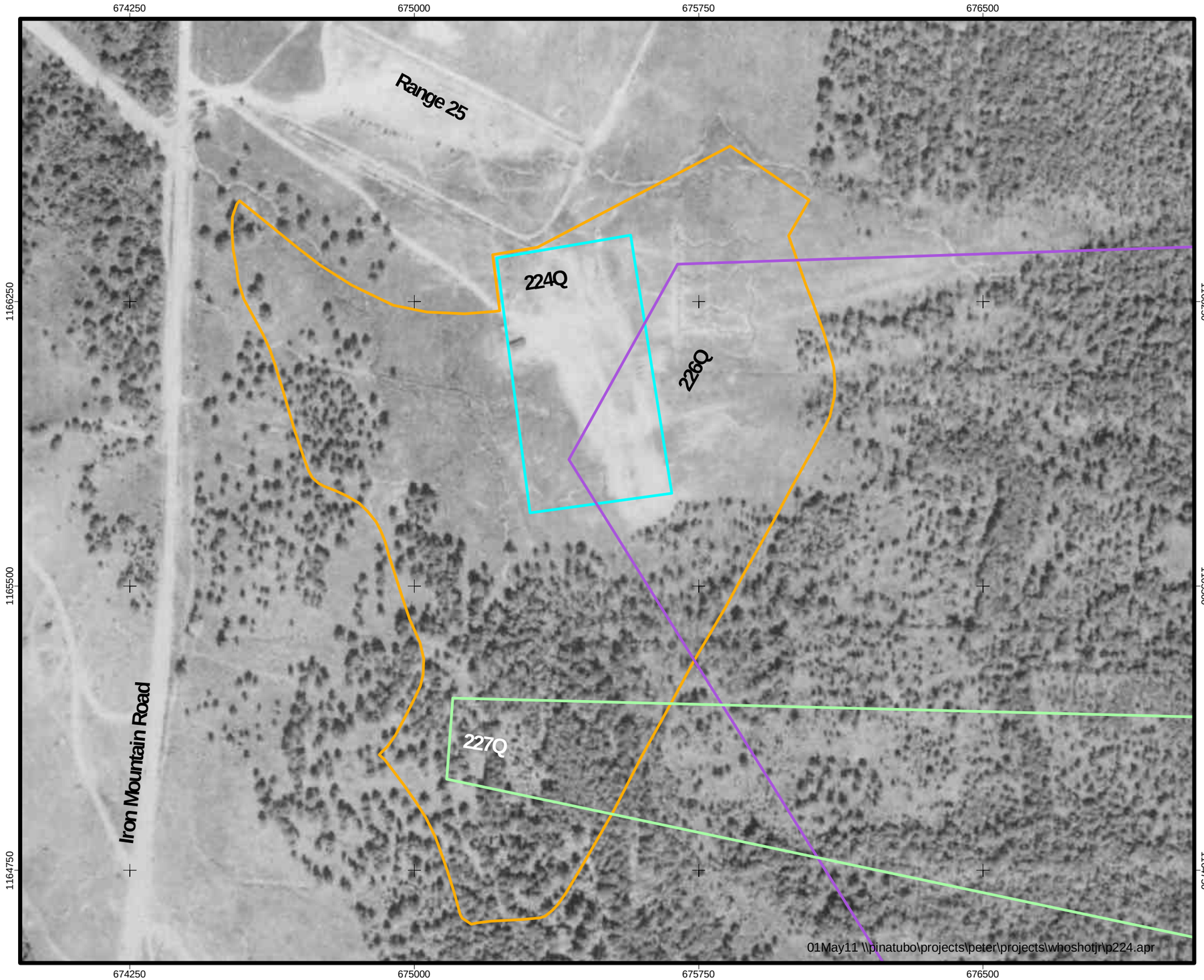

Figure 1-7

1940 Aerial Photograph - Inter War Range Use

Legend

- Area of Investigation
- Non-CERCLA Parcel 227Q
- Non-CERCLA Parcel 226Q
- Non-CERCLA Parcel 224Q

0 250 500

State Plane feet, NAD83

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Calhoun County, Alabama
Contract No. DACA21-96-D-0018

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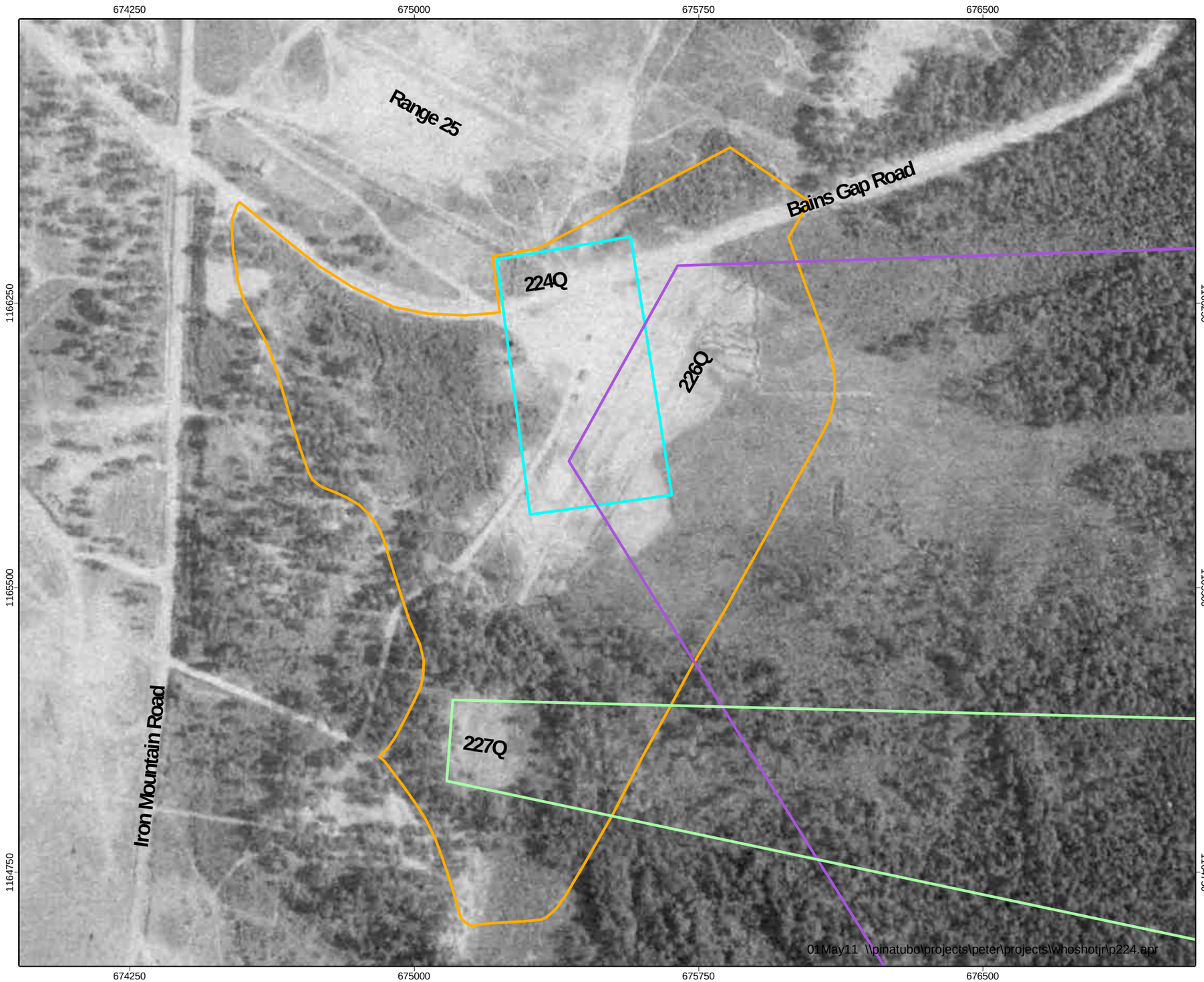

Figure 1-8

1944 Aerial Photograph - WWII to 1950 Range Use

Legend

- Area of Investigation
- Non-CERCLA Parcel 227Q
- Non-CERCLA Parcel 226Q
- Non-CERCLA Parcel 224Q

0 250 500

State Plane feet, NAD83

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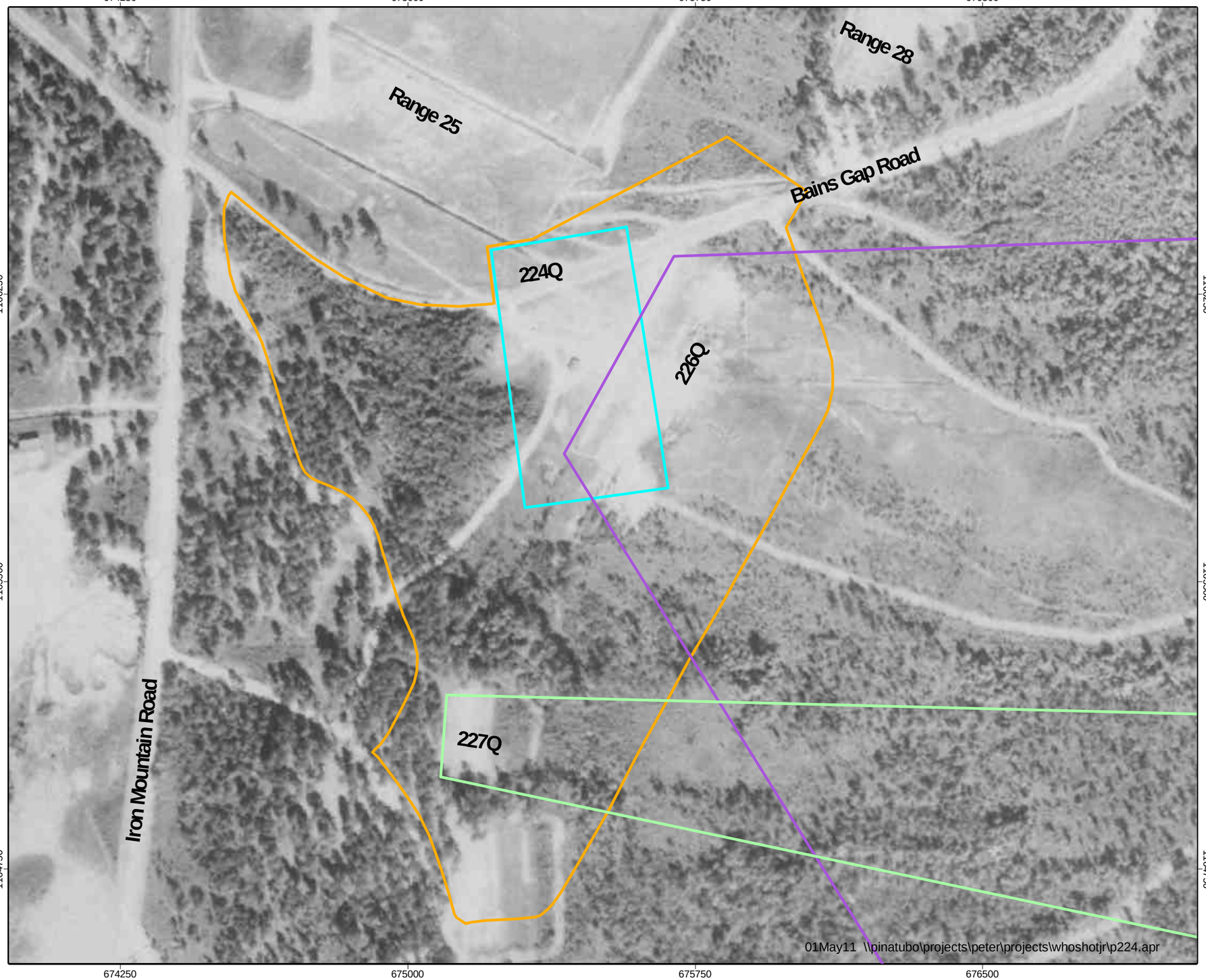

Figure 1-9

1954 Aerial Photograph - 1950 to 1973 Range Use

Legend

- Area of Investigation
- Non-CERCLA Parcel 227Q
- Non-CERCLA Parcel 226Q
- Non-CERCLA Parcel 224Q

0 250 500

State Plane feet, NAD83

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5 has a V-shaped firing line area. It may be that Unnamed Range H shown on Plate 6 of the ASR represents two ranges, with one being Parcel 227Q. The V-shaped firing line area may be a result of the buffer of tall trees separating two heavy-use areas shown in the 1954 aerial photograph, although Unnamed Range H does not match well with the bare areas observed in the photograph (Figure 1-8). There is another area of land use activity shown on the 1954 aerial photograph that matches Unnamed Range I (shown on Plate 6 of the ASR) which is located south of Unnamed Range H (Figure 1-5).

1961. This aerial photograph shows distinct land use activity in the study area, with present-day roads now in place throughout the area. Buildings have been constructed near the southern portion of the firing line area of Parcel 226Q (Figure 1-10). The rest of the study area appears similar to the 1944 and 1954 aerial photographs, with one exception. There is now land-use activity in the area of Range 23, just east of the study area. There had not been any evidence of activity in the area of Range 23 until the 1961 photograph, although, according to the EBS, Range 23 had been in use since 1951 (ESE, 1998). This may indicate that the ranges at Parcels 226Q and 227Q were no longer in use in 1961 and may have been abandoned, because the line of fire would have been to the south and east, toward Range 23.

1964. This aerial photograph clearly shows Range 23, just east of the study area, as an active range. It is not likely that any ranges within the study area are active at this time, due to the proximity of Range 25 to the north, Range 23 to the east and southeast, and the main cantonment to the west. An increase in vegetation and tree growth is observed in the previous heavy-use areas of Parcel 227Q and further south toward Snap Lane.

1969. This aerial photograph appears similar to the 1964 photograph. Some continued land-use activity is observed in the areas of Parcels 224Q and 226Q. The rest of the study area appears, in this photograph, to be increasingly reclaimed by vegetation and trees. Range 23 to the east and Range 25 to the north continue to appear very active.

1973. This photograph appears very similar to the 1969 photograph. Most of the areas in the study area have increased vegetation and tree growth, with the exception of the northeast corner of the study area in Parcel 226Q (Figure 1-11). This land use activity is mostly in the area of the probable firing line area of Parcel 226Q which appears to be continuously utilized, maybe as some type of training area or bivouac area.

Figure 1-10

1961 Aerial Photograph - 1950 to 1973 Range Use

Legend

- Area of Investigation
- Non-CERCLA Parcel 227Q
- Non-CERCLA Parcel 226Q
- Non-CERCLA Parcel 224Q

0 250 500

State Plane feet, NAD83

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674250 675000 675750 676500

1166250

1165500

1164750

Range 25

Range 28

Bains Gap Road

224Q

226Q

227Q

Snap Lane

Range 23

Iron Mountain Road

Coal Lane

01May11 \\pinatubo\projects\peter\projects\whoshotjr\p224.apr

Figure 1-11

1973 Aerial Photograph - 1950 to 1973 Range Use

Legend

- Area of Investigation
- Non-CERCLA Parcel 227Q
- Non-CERCLA Parcel 226Q
- Non-CERCLA Parcel 224Q

0 250 500

State Plane feet, NAD83

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1976, 1994, and 1998. This group of aerial photographs show little land use activity in the study area, except for the two buildings west of Snap Lane across from Range 23. There is increased vegetation and tree cover in the study area in these three photographs. Ranges 23 and 25, which are outside of the study area, continue to appear very active in these three aerial photographs. Also, land-use activity in the area of Range 26, east of the study area, begins to appear in the 1976 aerial photograph and continues to be very evident in the other two photographs.

Soil Types. Soils in this study area consist of the following three soil series (U.S. Department of Agriculture [USDA], 1961):

- Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded (AcB2) - North-central portion of the area, including Parcel 224Q
- Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded (AcC2) - East, south, and west areas of the study area, including Parcels 226Q and 227Q
- Atkins silt loam, 0 to 2 percent slopes (AkA) - West-central portion of the study area along Ingram Creek, west of Parcel 224Q.

The soil of Former Pistol Range South of Range 25, Parcel 224Q, consists of Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded (AcB2) (USDA, 1961). The Anniston and Allen Series of soils consist of friable, medium to strongly acidic, deep, well-drained soils that have developed in old local alluvium on the foot slopes and along the base of mountains. The parent material washed from the adjacent, higher-lying Linker, Muskingum, Enders, and Montevallo soils, which developed from weathered sandstone, shale, and quartzite. Sandstone and quartzite gravel, cobbles, and fragments as much as 8 inches in diameter are on the surface and throughout the soil (USDA, 1961).

The color of the surface soil ranges from dark brown and very dark brown to reddish brown and dark reddish brown. The texture of subsoil ranges from light clay loam to clay or silty clay loam. The alluvium ranges in thickness from 2 feet to more than 8 feet. Infiltration and runoff are medium, permeability is moderate, and the capacity for available moisture is high. Organic matter is moderately low. The depth to bedrock at these sites ranges from 2 feet to greater than 10 feet below ground surface (bgs). The depth to the water table is likely greater than 20 feet bgs (USDA, 1961).

The soils of Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, within the study area, consist of Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded (AcC2) (USDA, 1961). This mapping unit is similar to Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded, described for Parcel 224Q above. However, severely eroded places may be more common on the surface, and there are a few shallow gullies in places (USDA, 1961).

The soils along the Ingram Creek, west of Parcel 224Q, are of the Atkins series and consist of poorly drained, strongly acidic soils that are developing in general alluvium (USDA, 1961). This parent material has washed mainly from soils underlain by sandstone and shale. The Atkins surface soils are dark grayish-brown, mottled silt loam. The subsoils are light brownish-gray to light olive-gray, mottled silt loam or clay loam. The Atkins soils occur mainly in small, narrow bands in floodplains along streams in Calhoun County. The depth to bedrock typically ranges from 2 feet to 6 feet bgs. The depth to the water table for this series is usually near the ground surface.

Soils in this area are categorized as the Atkins silt loam, 0 to 2 percent slopes (AkA). This mapping unit is poorly drained, friable soil that is developing on first bottoms. Surface soils are dark grayish-brown silt loam, strongly acidic and friable. Subsoils are light grayish-brown to light brownish gray, strongly acidic and friable. The thickness of the alluvium ranges from 2 to 6 feet or more. Small areas having better drainage and some areas having a sandy loam to loam surface soil are also included in this unit. These areas will have a fine sandy loam to clay loam subsoil (USDA, 1961).

1.3 Scope of Work

The scope of work for activities associated with the SI at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, as specified by the statement of work (USACE, 1999b), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Conduct a surface and near-surface UXO survey over all areas to be included in the supplemental sampling effort.

- Provide downhole UXO support for all intrusive drilling to determine buried downhole hazards.

- Collect 35 surface soil samples, 32 subsurface soil samples, 13 groundwater samples, 16 surface water samples, and 16 sediment samples to determine whether potential site-specific chemicals (PSSC) are present at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, and to provide data useful for supporting any future planned corrective measures and closure activities.

- Analyze samples for the parameters listed in Section 4.5.

Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, fall within the "Possible Artillery Impact Areas" shown on Plate 10 of the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (USACE, 1999a). Therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at this site. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance. The site-specific UXO safety plan will be used to support sample collection activities at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, should incidental ordnance, explosive, and UXO be encountered and require avoidance.

The U.S. Army Corps of Engineers-Huntsville Center of Excellence is conducting separate investigations at Fort McClellan to determine the presence or absence of unexploded ordnance (UXO). Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q and Former Pistol Range, Parcel 227Q will be investigated for use as part of the Bravo Area Engineering Evaluation/Cost Analyses (EE/CA) investigation which began in April 2001.

At completion of the field activities and sample analyses, draft and final SI summary reports will be prepared to summarize the results of the activities, to evaluate the absence or presence of PSSCs at this site, and to recommend further actions, if appropriate. SI sampling reports will be prepared in accordance with current U.S. Environmental Protection Agency (EPA), Region IV, and the Alabama Department of Environmental Management (ADEM) guidelines.

2.0 Summary of Existing Environmental Studies

The EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by the following seven criteria:

1. Areas where no storage, release, or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas)

2. Areas where only release or disposal of petroleum products has occurred

3. Areas where release, disposal, and/or migration of hazardous substance has occurred, but at concentrations that do not require a removal or remedial response

4. Areas where release, disposal, and/or migration of hazardous substance has occurred, and all removal or remedial actions to protect human health and the environment have been taken

5. Areas where release, disposal, and/or migration of hazardous substance has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken

6. Areas where release, disposal, and/or migration of hazardous substance has occurred, but required actions have not yet been implemented

7. Areas that are not evaluated or require further evaluation.

For non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number, the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified Parcel, and the code for the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)
- P = Polychlorinated biphenyls

- R = Radon (in buildings)
- RD = Radionuclides/radiological issues
- X = UXO
- CWM = Chemical warfare material.

The EBS was conducted in accordance with the CERFA (CERFA-Public Law 102-426) protocols and U.S. Department of Defense policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, were identified as Category 1 CERFA sites. These CERFA sites are parcels where no known or recorded storage, release, or disposal (including migration) has occurred on site property, but are qualified because the sites were active ranges. Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, also require additional evaluation to determine the environmental condition of the parcels.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. This section incorporates the components of the DQO process described in the publication EPA 540-R-93-071 *Data Quality Objectives Process for Superfund* (EPA, 1993). The DQO process as applied to Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, is described in more detail in Section 4.3 of the WP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples and the procedures necessary to meet the objectives of the SI and establish a basis for future action at this site.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Chapter 4.0 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The available data, presented in Table 3-1, related to the SI at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, have been used to formulate a site-specific conceptual model. This conceptual model was developed to support the development of this SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the site. The users of the data and information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and the USACE supporting contractors. This SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to

Table 3-1

Summary of Data Quality Objectives
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Site Investigation
Fort McClellan, Calhoun County, Alabama

Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation Other contractors, and possible future land users	None	Contaminant Source Former Pistol Range South of Range 25, Parcel 224Q, the Former Machine Gun Range, Parcel 226Q, and the Former Pistol Range, Parcel 227Q (explosives and lead) Migration Pathways Infiltration to subsurface soil, infiltration and leaching to groundwater, biotransfer to venison, dust emissions and volatilization to ambient air, groundwater discharge to surface water, and runoff and erosion to surface water and sediment Potential Receptors Residents (future), Recreational site user (current and future) PSSC metals, nitroexplosives	Surface soil Subsurface Soil Groundwater Surface Water Sediment	SI to confirm the presence or absence of contamination in the site media Definitive quality data for future decision-making	Surface soil TAL Metals and Nitroexplosives	Definitive data in CESAS Level B data packages	35 direct-push surface soil samples + QC
					Subsurface Soil TAL Metals and Nitroexplosives	Definitive data in CESAS Level B data packages	32 direct-push subsurface soil samples + QC
					Groundwater TAL Metals and Nitroexplosives	Definitive data in CESAS Level B data packages	13 groundwater samples + QC
					Surface Water TAL Metals and Nitroexplosives	Definitive data in CESAS Level B data packages	16 surface water samples + QC
					Sediment TAL Metals, Nitroexplosives, TOC and Grain Size	Definitive data in CESAS Level B data packages	16 sediment samples + QC

ADEM - Alabama Department of Environmental Management.
CESAS - Corps of Engineers South Atlantic Savannah.
DOD - U.S. Department of Defense.
EPA - U.S. Environmental Protection Agency.
FTMC - Fort McClellan.
USACE - U.S. Army Corps of Engineers.
SI - Site investigation.
QC - Quality control.
TAL - Target analyte list.
TOC - Total organic carbon.
PSSC - Potential site-specific chemical.

provide the level of defensible data and information required to confirm or rule out the existence of residual chemical contamination in site media.

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks and hazards to human health in the risk assessment. The CSEM includes receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates a consistent and comprehensive evaluation of risk to human health through graphically presenting all possible exposure pathways, including sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact scenarios with a contaminated source medium.

Primary contaminant releases were probably limited to training activities. Potential contaminant transport pathways include infiltration and leaching to subsurface soil and groundwater, biotransfer to deer through browsing, dust emissions and volatilization to ambient air, groundwater discharge to surface water, surface water runoff, and erosion to surface water and sediment.

Currently the ranges are not utilized and are not maintained. Trees cover most of the study area. The ranges are not fenced; therefore, people may trespass at the sites for hunting. There is not sufficient surface water to support fish habitat for fish consumption. The only plausible receptor under the current land-use scenario is a recreational site user who may hunt. Other potential receptors considered, but not included under the current land-use scenario, are the:

- ***Groundskeeper.*** The ranges are not currently maintained and will not be in the future.

- ***Construction Worker.*** The site is unused, and no development or construction is occurring or scheduled.

- ***Resident.*** The site is not currently used for residential purposes.

Future land-use in this area is shown as remediation reserve and passive recreation (FTMC, 1997). The sites may not be deemed safe for public access until remediation has been completed because of the potential for UXO (FTMC, 1997). Plausible future land-use receptor scenarios addressed in the CSEM include:

- ***Resident.*** Although the site is not planned for residential use, the residential scenario is considered in order to provide information for the project manager and regulators.

- ***Recreational Site User.*** Because the future site is planned for passive recreational use, and hunting is a viable option, the recreational site user is included. Fish ingestion will not be evaluated because the streams are too small to support fish for consumption.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors and exposure pathways for this site is provided in Table 3-1 and Figure 3-1.

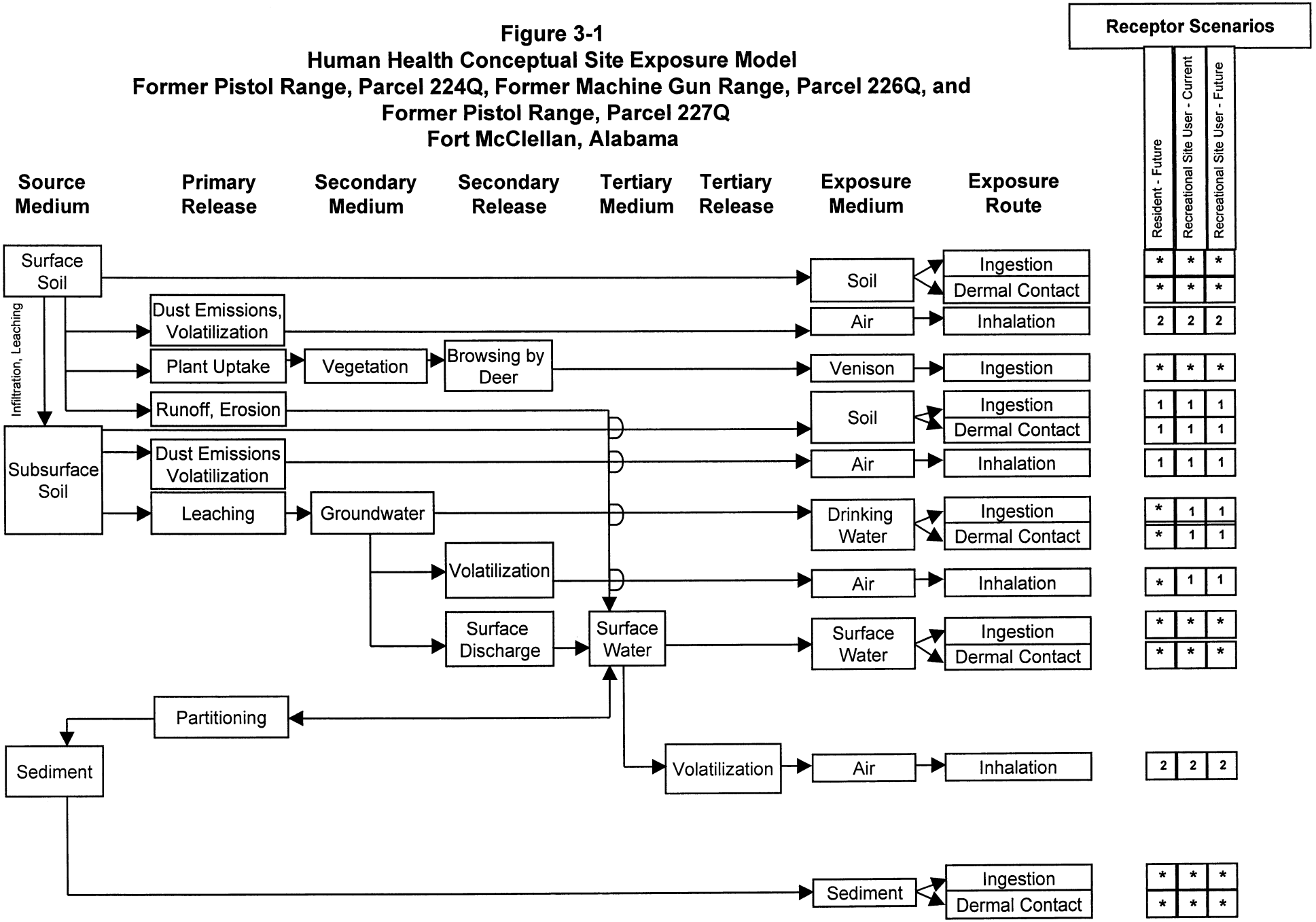
3.4 Decision-Making Process, Data Uses, and Needs

The decision-making process consists of a seven-step process that is presented in detail in Section 4.3 of the WP and will be followed during the SI at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

Confirmation of contamination at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, will be based on comparing detected site chemicals of potential concern to site-specific screening levels developed in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). EPA definitive data with CESAS Level B data packages will be used to determine whether or not PSSCs are detected in site media. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

Figure 3-1
Human Health Conceptual Site Exposure Model
Former Pistol Range, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama



* = Complete exposure pathway evaluated in the streamlined risk assessment.
1 = Incomplete exposure pathway.
2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

Assessment of potential ecological risk associated with sites or parcels (e.g., surface water and sediment sampling, specific ecological assessment methods, etc.) will be addressed in accordance with the procedures in the WP.

3.4.2 Data Types and Quality

Surface soil, subsurface soil, groundwater, surface water, and sediment will be sampled and analyzed to meet the objectives of the SI at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 Methods Update III, where available; comply with EPA definitive data requirements; and be reported using hard-copy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

Laboratory requirements of precision, accuracy, and completeness for this SI are provided in Section 9.0 of the QAP.

4.0 Field Activities

4.1 UXO Survey Requirements and Utility Clearances

Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, fall within the "Possible Artillery Impact Area" shown on Plate 10 of the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (USACE, 1999a). Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings. The site-specific UXO safety work plan provides technical guidance for ordnance and explosives avoidance and construction activities for sample collection activities at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. The site-specific UXO safety work plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2000a).

4.1.1 Surface UXO Survey

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for easy avoidance. Subsurface metallic anomalies will not be disturbed, but will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Chapter 4.0 and Appendices D and E of the approved SAP (IT, 2000a).

4.1.2 Downhole UXO Survey

During the soil boring and downhole sampling, downhole UXO surveys will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Chapter 4.0 of the SAP (IT, 2000a), will continue until undisturbed soils are encountered or the borehole has been advanced to 12 feet bgs, whichever is reached first.

4.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP (IT, 2000a). The site manager will mark the proposed locations with stakes, coordinate with the local utility

companies to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

4.2 Environmental Sampling

The environmental sampling program at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, includes the collection of surface soil, subsurface soil, groundwater, surface water, and sediment samples for chemical analyses. These samples will be collected and analyzed to provide data for characterizing the site to determine the environmental condition of the site and any further action to be conducted at the site. Additionally, samples will be collected from environmental media in locations that will assist in the assessment of potential ecological impacts resulting from activities at the site.

4.2.1 Surface Soil Sampling

Surface soil samples will be collected from 35 locations at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q.

4.2.1.1 Sample Locations and Rationales

The surface soil sampling rationales are listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and QA/QC sample requirements are summarized in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.1.2 Sample Collection

Surface soil samples will be collected from the upper 1 foot of soil by direct-push methodology as specified in Section 4.7.1.1 of the SAP (IT, 2000a). Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 4.15 of the SAP. Surface soil samples will be screened for information purposes only, and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

Table 4-1

Sampling Locations and Rationale
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
224Q	HR-224Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed southwest of Parcel 224Q in the southwestern portion of Unnamed Range B. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-224Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the west-central area of Parcel 224Q, downslope of the concrete slabs and the mound of broken concrete. This location is near the center of Unnamed Range B and in the northern portion of Unnamed Range A. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-224Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the north-central area of Parcel 224Q in the area of heavy use observed in early aerial photographs. This location is in the north-central portion of Unnamed Range B. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-224Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the central area of Parcel 224Q, downslope of a large concrete slab in the area of heavy use observed in early aerial photographs. This location is in the north-central portion of Unnamed Range A. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-224Q-GP05	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the northeast corner of Parcel 224Q, downslope of a large wood debris pile, north of Bains Gap Road. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-224Q-GP06	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the center area of the berm that runs diagonally across Parcel 224Q, southeast of the concrete slab. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the berm and the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-224Q-MW01	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed north of the concrete slab and mound of broken concrete near the western boundary of Parcel 224Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-224Q-MW02	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed southwest of the southwestern end of the berm the runs diagonally across Parcel 224Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-224Q-MW03	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed on the north side of the berm the runs diagonally across Parcel 224Q, southeast of the concrete slab. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-224Q-MW04	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed between Parcels 224Q and 226Q on the north side of the berm the runs diagonally across Parcel 224Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-224Q-MW05	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed west of Parcel 224Q, northwest of the mound of broken concrete. This location is a downslope of the northern portion of Parcel 224Q where it appeared most of the activities were conducted at Parcel 224Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.

Table 4-1

Sampling Locations and Rationale
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
224Q	HR-224Q-SW/SD01	Surface water and Sediment	The sample location will be placed upstream of Parcel 224Q on Ingram Creek. Sample data will indicate if contaminant releases have occurred from runoff upstream of Parcel 224Q from former activities in this area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-224Q-SW/SD02	Surface water and Sediment	The sample location will be placed west of Parcel 224Q on Ingram Creek just upstream of the confluence with an intermittent stream that flows west across Parcel 224Q. Sample data will indicate if contaminant releases have occurred from runoff from former activities in this area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-224Q-SW/SD03	Surface water and Sediment	The sample location will be placed on the intermittent stream that flows west across Parcel 224Q just before the confluence with Ingram Creek. Sample data will indicate if contaminant releases have occurred from runoff from former activities in this area of Parcel 224Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-224Q-SW/SD04	Surface water and Sediment	The sample location will be placed on the intermittent stream that flows west across the northern portion of Parcel 224Q along Bains Gap Road. Sample data will indicate if contaminant releases have occurred from runoff from former activities in this area of Parcel 224Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-224Q-SW/SD05	Surface water and Sediment	The sample location will be placed on Ingram Creek, west of Parcel 224Q before if flows under Bains Gap Road. Sample data will indicate if contaminant releases have occurred from runoff from former activities in this area west of Parcel 224Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-224Q-SW/SD06	Surface water and Sediment	The sample location will be placed on the west flowing intermittent stream west of Parcel 224Q. This streams flows west and converges with Ingram Creek just before it flows under Bains Gap Road. Sample data will indicate if contaminant releases have occurred from runoff from former activities in this area west of Parcel 224Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-224Q-SW/SD07	Surface water and Sediment	The sample location will be placed on the west flowing intermittent stream at the boundary of the study area, north of Parcel 224Q, and north of Bains Gap Road. This stream flows west from the northern end of Unnamed Range G and across the northern end of Unnamed Range B. Sample data will indicate if contaminant releases have occurred from runoff from former activities in this area, north of Parcels 224Q and 226Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
226Q	HR-226Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located near the eastern boundary Parcel 226Q, near Snap Lane. The location is downrange of the probable firing area of Unnamed Range H. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located near the southwestern boundary Parcel 226Q and Unnamed Range E. The location is downslope of the former buildings near Snap Lane. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located near the central area of Parcel 226Q, north of the former buildings at Snap Lane. The location is in the center portion of Unnamed Range E. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located near the central area of Parcel 226Q, northeast of the former buildings at Snap Lane. Also, the location is at the southern end of Unnamed Range C near Snap Lane. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP05	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located near the northwestern area of the probable firing area for Parcel 226Q and is located in the northern end of Unnamed Range C. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP06	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located north of the probable firing area for Parcel 226Q and north of Bains Gap Road. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.

Table 4-1

Sampling Locations and Rationale
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
226Q	HR-226Q-GP07	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located near the toe of the southwestern end of the natural embankment that appears to have been used as a impact area in the center of Parcel 226Q and Unnamed Range E. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP08	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located down slope of two rusted 55-gallon drums. The rusted 55-gallon drums were just east of the toe of the natural embankment that appears to have been used as a impact area in the center of Parcel 226Q and Unnamed Range E. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP09	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located near the toe of the central area of the natural embankment that appears to have been used as a impact area in the center of Parcel 226Q and Unnamed Range E. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP10	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located near the toe of the northeastern end of the natural embankment that appears to have been used as a impact area in the center of Parcel 226Q and Unnamed Range E. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP11	Surface soil	Surface soil sample to be located in the eastern portion of the cleared area, near the center of Parcel 226Q. Small arms fragmentation was observed in the cleared area. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP12	Surface soil	Surface soil sample to be located in the southern portion of the cleared area, near the center of Parcel 226Q. Small arms fragmentation was observed in the cleared area. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-GP13	Surface soil	Surface soil sample to be located in the western portion of the cleared area, near the center of Parcel 226Q. Small arms fragmentation was observed in the cleared area. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-226Q-MW01	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be located west and downslope of Parcel 226Q and Unnamed Range E. The location is near the probable firing area for Unnamed Range H. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-226Q-MW02	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be located in the central area of the probable firing line for Parcel 226Q and in the southwestern portion of Unnamed Range G. The location is a bare area observed on all aerial photographs and where small arms fragmentation has been observed. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-226Q-MW03	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be located in the central area Parcel 226Q and in the central areas of Unnamed Ranges C and E. This location is a heavy land use area observed on early aerial photographs. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-226Q-MW04	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be located in the southwestern area of the probable firing line for Parcel 226Q and in the southwestern areas for Unnamed Ranges D and G. This location is a heavy land use area observed on early aerial photographs. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.

Table 4-1

Sampling Locations and Rationale
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
226Q	HR-226Q-MW05	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be located in the south central area of Parcel 226Q and in the southwestern area for Unnamed Range E. This location is downslope of the former buildings off of Snap Lane and west of Range 23. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-226Q-SW/SD01	Surface water and Sediment	The sample location will be placed in the intermittent stream at the edge of the study area as the streams flows west under Snap Lane into the eastern boundary of Parcel 226Q. Sample data will indicate if contaminant releases have occurred from runoff upstream of this area east of Parcel 226Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-226Q-SW/SD02	Surface water and Sediment	The sample location will be placed in the intermittent stream at the edge of the study area as the stream flows west under Snap Lane at Bains Gap Road into the eastern boundary of Parcel 226Q. Sample data will indicate if contaminant releases have occurred from runoff upstream of former activities this area east of Parcel 226Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-226Q-SW/SD03	Surface water and Sediment	The sample location will be placed between Parcels 224Q and 226Q in the intermittent stream at the northern boundary of the study area. The stream flows west along Bains Gap Road into Parcel 224Q. Sample data will indicate if contaminant releases have occurred from runoff from former activities in Parcel 226Q and upstream of 224Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-226Q-SW/SD04	Surface water and Sediment	The sample location will be placed in the intermittent stream at the eastern boundary of Parcel 224Q as the stream flows west through Parcel 226Q. Sample data will indicate if contaminant releases have occurred from runoff from former activities in Parcel 226Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-226Q-SW/SD05	Surface water and Sediment	The sample location will be placed in the intermittent stream at the northern boundary of the study area, north of Parcel 226Q, as the stream flows west through the northern end of Unnamed Range G. Sample data will indicate if contaminant releases have occurred from runoff from upstream of the study area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
227Q	HR-227Q-GP01	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed just south of the probable firing line for Parcel 227Q and in the southern areas of probable firing areas for Unnamed Ranges F and J. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-227Q-GP02	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed just west of the probable firing line for Parcel 227Q and downslope of the railroad ties and coal pile at Coal Lane. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-227Q-GP03	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed north of the probable firing line for Parcel 227Q and in the area of the probable firing line for Unnamed Range H. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-227Q-MW01	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed south of Parcel 227Q and in the southern edges of Unnamed Ranges F and H. The area was observed to be an active land use area in aerial photographs. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-227Q-MW02	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the area of the probable firing line for of Parcel 227Q and in the northern area of Unnamed Range J. The area was observed to be an active land use area in aerial photographs. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.

Table 4-1

Sampling Locations and Rationale
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
227Q	HR-227Q-MW03	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the central areas of Parcel 227Q and unnamed Range F. This location is also in the western area of Unnamed Range H. The area was observed to be an active land use area in aerial photographs. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-227Q-SW/SD01	Surface water and Sediment	The sample location will be placed in the intermittent stream at the southern edge of the study area, south of Parcel 227Q. The sample location is in the stream that flows east from under Coal Lane at Snap Lane along the southern boundary of the study area. Sample data will indicate if contaminant releases have occurred from runoff upstream of this area south of Parcel 227Q and the study area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-227Q-SW/SD02	Surface water and Sediment	The sample location will be placed in the intermittent stream at the edge of the study area at the eastern boundary of Parcel 227Q, along Snap Lane. The location is just before the confluence with Ingram Creek as it flows west from under Snap Lane. Sample data will indicate if contaminant releases have occurred from runoff in the area south of Parcel 227Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-227Q-SW/SD03	Surface water and Sediment	The sample location will be placed in Ingram Creek on the east side of Snap Lane in the area of Parcel 227Q . The location is in Ingram Creek just before it flows west under Snap Lane. Sample data will indicate if contaminant releases have occurred from runoff upstream of this area east of Parcel 227Q and the study area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-227Q-SW/SD04	Surface water and Sediment	The sample location will be placed in Ingram Creek, north of Parcel 227Q. Sample data will indicate if contaminant releases have occurred from runoff from the area of Parcel 227Q and Unnamed Ranges A, F, H, and J. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.

STARTING DATE: 04/19/01 | DATE LAST REV.: | DRAFT. CHCK. BY: | INITIATOR: L. O'HARE | DWG. NO.: ...\796887es.161
DRAWN BY: D. BOMAR | DRAWN BY: | ENGR. CHCK. BY: J. RACSDALE | PROJ. MGR.: J. YACOUB | PROJ. NO.: 796887

DBILLING 06/26/01
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24 X 36

E 674,500 | E 677,000
N 1,166,300 | N 1,164,600

RANGE 25 | RANGE 26 | RANGE 23

PARCEL 224Q | PARCEL 226Q | PARCEL 227Q

40.3 ACRES

INGRAM CREEK | IRON MOUNTAIN ROAD | BAINS GAP ROAD | SNAP LANE | COAL LANE

BRUSH PILE | CONCRETE SLABS | MOUND WITH BROKEN CONCRETE | 12'x4' TRENCH | RAILROAD CROSS TIES AND STEEL RAILS ARE PLACED ALONG THE BERM | SINGLE METAL RAIL POSSIBLY USED TO MANEUVER SMALL ARMS TARGETS | CLEAR AREA WITH SMALL ARMS FRAGMENTATION (LEAD) | TWO EMPTY RUSTED 55-GALLON DRUMS | NEW FIRE BREAK | NATURAL EMBANKMENT USED AS IMPACT AREA | MESS FAC. | CONTROL TOWER | LATRINE | COAL PILE | RAILROAD TIES | SMALL DEPRESSIONS

A (FORMER RANGE 23) | B (PISTOL RANGE) | C | D | E | F | G | H | I | J

HR-224Q-SW/SD01 | HR-224Q-SW/SD02 | HR-224Q-SW/SD03 | HR-224Q-SW/SD04 | HR-224Q-SW/SD05 | HR-224Q-SW/SD06 | HR-224Q-SW/SD07
HR-224Q-GP01 | HR-224Q-GP02 | HR-224Q-GP03 | HR-224Q-GP04 | HR-224Q-GP05 | HR-224Q-GP06
HR-224Q-MW02 | HR-224Q-MW03 | HR-224Q-MW04 | HR-224Q-MW05 | HR-224Q-MW06
HR-226Q-SW/SD01 | HR-226Q-SW/SD02 | HR-226Q-SW/SD03 | HR-226Q-SW/SD04 | HR-226Q-SW/SD05
HR-226Q-GP01 | HR-226Q-GP02 | HR-226Q-GP03 | HR-226Q-GP04 | HR-226Q-GP05 | HR-226Q-GP06 | HR-226Q-GP07 | HR-226Q-GP08 | HR-226Q-GP09 | HR-226Q-GP10 | HR-226Q-GP11 | HR-226Q-GP12 | HR-226Q-GP13
HR-226Q-MW01 | HR-226Q-MW02 | HR-226Q-MW03 | HR-226Q-MW04 | HR-226Q-MW05
HR-227Q-SW/SD01 | HR-227Q-SW/SD02 | HR-227Q-SW/SD03 | HR-227Q-SW/SD04
HR-227Q-GP01 | HR-227Q-GP02 | HR-227Q-GP03
HR-227Q-MW01 | HR-227Q-MW02 | HR-227Q-MW03

FLOW

LEGEND:

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- EBS PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- UTILITY POLE
- BERM / MOUND
- DEPRESSION
- TRENCH
- PROPOSED SURFACE WATER/SEDIMENT SAMPLE LOCATION
- PROPOSED SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- PROPOSED GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- PROPOSED SURFACE SOIL SAMPLE LOCATION
- RANGES SHOWN ON THE RANGE USE PLATES (4,5,6 AND 10) OF THE ARCHIVE SEARCH REPORT SOURCE: USACE "ARCHIVE SEARCH REPORT, MAPS, FORT McCLELLAN, ANNISTON ALABAMA", JULY 1999
- AREA OF INVESTIGATION (40.3 ACRES)

SCALE
0 100 200 FEET

FIGURE 4-1
PROPOSED SAMPLE LOCATION MAP
FORMER PISTOL RANGE SOUTH OF RANGE 25, PARCEL 224Q
FORMER MACHINE GUN RANGE
PARCEL 226Q
FORMER PISTOL RANGE
PARCEL 227Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Parcels 224Q, 226Q, and 227Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-224Q-GP01	HR-224Q-GP01-SS-QE0001-REG	0-1				TAL Metals and Nitroexplosives
	HR-224Q-GP01-DS-QE0002-REG	a				
HR-224Q-GP02	HR-224Q-GP02-SS-QE0003-REG	0-1				TAL Metals and Nitroexplosives
	HR-224Q-GP02-DS-QE0004-REG	a	HR-224Q-GP02-DS-QE0005-FD			
HR-224Q-GP03	HR-224Q-GP03-SS-QE0006-REG	0-1				TAL Metals and Nitroexplosives
	HR-224Q-GP03-DS-QE0007-REG	a				
HR-224Q-GP04	HR-224Q-GP04-SS-QE0008-REG	0-1				TAL Metals and Nitroexplosives
	HR-224Q-GP04-DS-QE0009-REG	a				
HR-224Q-GP05	HR-224Q-GP05-SS-QE0010-REG	0-1				TAL Metals and Nitroexplosives
	HR-224Q-GP05-DS-QE0011-REG	a				
HR-224Q-GP06	HR-224Q-GP06-SS-QE0012-REG	0-1				TAL Metals and Nitroexplosives
	HR-224Q-GP06-DS-QE0013-REG	a				
HR-224Q-MW01	HR-224Q-MW01-SS-QE0014-REG	0-1			HR-224Q-MW01-SS-QE0014-MS/MSD	TAL Metals and Nitroexplosives
	HR-224Q-MW01-DS-QE0015-REG	a				
HR-224Q-MW02	HR-224Q-MW02-SS-QE0016-REG	0-1				TAL Metals and Nitroexplosives
	HR-224Q-MW02-DS-QE0017-REG	a				
HR-224Q-MW03	HR-224Q-MW03-SS-QE0018-REG	0-1				TAL Metals and Nitroexplosives
	HR-224Q-MW03-DS-QE0019-REG	a				
HR-224Q-MW04	HR-224Q-MW04-SS-QE0020-REG	0-1				TAL Metals and Nitroexplosives
	HR-224Q-MW04-DS-QE0021-REG	a				
HR-224Q-MW05	HR-224Q-MW05-SS-QE0022-REG	0-1				TAL Metals and Nitroexplosives
	HR-224Q-MW05-DS-QE0023-REG	a	HR-224Q-MW05-DS-QE0024-FD			
HR-226Q-GP01	HR-226Q-GP01-SS-MR0001-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-GP01-DS-MR0002-REG	a				

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Parcels 224Q, 226Q, and 227Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-226Q-GP02	HR-226Q-GP02-SS-MR0003-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-GP02-DS-MR0004-REG	a				
HR-226Q-GP03	HR-226Q-GP03-SS-MR0005-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-GP03-DS-MR0006-REG	a				
HR-226Q-GP04	HR-226Q-GP04-SS-MR0007-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-GP04-DS-MR0008-REG	a				
HR-226Q-GP05	HR-226Q-GP05-SS-MR0009-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-GP05-DS-MR0010-REG	a				
HR-226Q-GP06	HR-226Q-GP06-SS-MR0011-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-GP06-DS-MR0012-REG	a	HR-226Q-GP06-DS-MR0013-FD			
HR-226Q-GP07	HR-226Q-GP07-SS-MR0014-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-GP07-DS-MR0015-REG	a				
HR-226Q-GP08	HR-226Q-GP08-SS-MR0016-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-GP08-DS-MR0017-REG	a				
HR-226Q-GP09	HR-226Q-GP09-SS-MR0018-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-GP09-DS-MR0019-REG	a				
HR-226Q-GP10	HR-226Q-GP10-SS-MR0020-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-GP10-DS-MR0021-REG	a				
HR-226Q-GP11	HR-226Q-GP11-SS-MR0022-REG	0-1				TAL Metals and Nitroexplosives
	No subsurface sample					
HR-226Q-GP12	HR-226Q-GP12-SS-MR0023-REG	0-1				TAL Metals and Nitroexplosives
	No subsurface sample					
HR-226Q-GP13	HR-226Q-GP13-SS-MR0024-REG	0-1				TAL Metals and Nitroexplosives
	No subsurface sample					

Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities
Parcels 224Q, 226Q, and 227Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-226Q-MW01	HR-226Q-MW01-SS-MR0025-REG	0-1			HR-226Q-MW01-SS-MR0025-MS/MSD	TAL Metals and Nitroexplosives
	HR-226Q-MW01-DS-MR0026-REG	a				
HR-226Q-MW02	HR-226Q-MW02-SS-MR0027-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-MW02-DS-MR0028-REG	a				
HR-226Q-MW03	HR-226Q-MW03-SS-MR0029-REG	0-1	HR-226Q-MW03-SS-MR0030-FD			TAL Metals and Nitroexplosives
	HR-226Q-MW03-DS-MR0031-REG	a				
HR-226Q-MW04	HR-226Q-MW04-SS-MR0032-REG	0-1				TAL Metals and Nitroexplosives
	HR-226Q-MW04-DS-MR0033-REG	a				
HR-226Q-MW05	HR-226Q-MW05-SS-MR0034-REG	0-1	HR-226Q-MW05-SS-MR0035-FD			TAL Metals and Nitroexplosives
	HR-226Q-MW05-DS-MR0036-REG	a				
HR-227Q-GP01	HR-227Q-GP01-SS-MH0001-REG	0-1				TAL Metals and Nitroexplosives
	HR-227Q-GP01-DS-MH0002-REG	a				
HR-227Q-GP02	HR-227Q-GP02-SS-MH0003-REG	0-1				TAL Metals and Nitroexplosives
	HR-227Q-GP02-DS-MH0004-REG	a				
HR-227Q-GP03	HR-227Q-GP03-SS-MH0005-REG	0-1				TAL Metals and Nitroexplosives
	HR-227Q-GP03-DS-MH0006-REG	a				
HR-227Q-MW01	HR-227Q-MW01-SS-MH0007-REG	0-1			HR-227Q-MW01-SS-MH0007-MS/MSD	TAL Metals and Nitroexplosives
	HR-227Q-MW01-DS-MH0008-REG	a				
HR-227Q-MW02	HR-227Q-MW02-SS-MH0009-REG	0-1				TAL Metals and Nitroexplosives
	HR-227Q-MW02-DS-MH0010-REG	a				
HR-227Q-MW03	HR-227Q-MW03-SS-MH0011-REG	0-1	HR-227Q-MW03-SS-MH0012-FD			TAL Metals and Nitroexplosives
	HR-227Q-MW03-DS-MH0013-REG	a				

[a] Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
TAL - Target analyte list.

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from 32 borings installed at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q.

4.2.2.1 Sample Locations and Rationales

Subsurface soil samples will be collected from the soil borings proposed on Figure 4-1. The subsurface soil sampling rationales are listed in Table 4-1. Subsurface soil samples to be collected are listed in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field observations and utility clearance results.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot below ground surface in the unsaturated zone. The soil borings will be advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.7.1.1 of the SAP (IT, 2000a).

Soil samples will be collected continuously for the first 12 feet or until either groundwater or refusal is reached. A detailed lithogical log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analysis. The collected subsurface soil samples will be field-screened using a PID in accordance with Section 4.15 of the SAP to measure samples exhibiting elevated readings exceeding background (readings in ambient air). Typically, the subsurface soil sample showing the highest reading (above background) will be selected and sent to the laboratory for analysis. If none of the samples indicate readings exceeding background using the PID, the deepest interval from the soil boring will be sampled and submitted to the laboratory for analysis. Subsurface soil samples may be selected for analysis from any depth interval if the on-site geologist suspects PSSCs at the interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analysis. More than one subsurface soil sample will be collected if field measurements and observations indicate a possible layer of PSSCs and/or additional sample data would provide insight to the existence of any PSSCs.

Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in

this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.3 Permanent Residuum Monitoring Wells

Thirteen permanent residuum monitoring wells will be installed at the study area of Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. The permanent residuum monitoring well locations are shown on Figure 4-1. The rationales for the monitoring well locations are presented in Table 4-1. The monitoring well boreholes will be drilled to the top of bedrock, or until adequate groundwater is encountered to install a well with a 10 to 20 foot screen. Monitoring wells will be installed using a truck-mounted hollow-stem auger drill rig. The monitoring well casing will consist of new 2-inch inside-diameter, Schedule 40, threaded, flush-joint, polyvinyl chloride pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap polyvinyl chloride well screen, approximately 10 to 20 feet long. The well will be installed so the well screen bridges the water table.

Soil samples for lithology will be collected continuously every 5 feet to the total depth of the hole during hollow-stem auger drilling to provide a detailed lithologic log. The samples will be collected for lithology using a 24-inch long, 2-inch or larger diameter, split-spoon sampler. The soil borings will be logged in accordance with American Standard for Testing and Materials Method D 2488 using the Unified Soil Classification System. The soil samples will be screened in the field using a PID. The monitoring wells will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000a). The exact monitoring well locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.4 Groundwater Sampling

Groundwater samples will be collected from the 13 monitoring wells completed in Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, as presented in Section 4.2.3.

4.2.4.1 Sample Locations and Rationales

Groundwater samples will be collected from the monitoring well locations shown on Figure 4-1. The groundwater sampling rationales are listed in Table 4-1. The groundwater sample designations, depths, and QA/QC sample quantities are listed in Table 4-3.

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama

Sample Location	Sample Designation	Sample Matrix [a]	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-224Q-MW01	HR-224Q-MW01-GW-QE3001-REG	Groundwater				TAL Metals and Nitroexplosives
HR-224Q-MW02	HR-224Q-MW02-GW-QE3002-REG	Groundwater				TAL Metals and Nitroexplosives
HR-224Q-MW03	HR-224Q-MW03-GW-QE3003-REG	Groundwater				TAL Metals and Nitroexplosives
HR-224Q-MW04	HR-224Q-MW04-GW-QE3004-REG	Groundwater	HR-224Q-MW04-GW-QE3005-FD			TAL Metals and Nitroexplosives
HR-224Q-MW05	HR-224Q-MW05-GW-QE3006-REG	Groundwater				TAL Metals and Nitroexplosives
HR-226Q-MW01	HR-226Q-MW01-GW-MR3001-REG	Groundwater			HR-226Q-MW01-GW-MR3001-MS/MSD	TAL Metals and Nitroexplosives
HR-226Q-MW02	HR-226Q-MW02-GW-MR3002-REG	Groundwater				TAL Metals and Nitroexplosives
HR-226Q-MW03	HR-226Q-MW03-GW-MR3003-REG	Groundwater				TAL Metals and Nitroexplosives
HR-226Q-MW04	HR-226Q-MW04-GW-MR3004-REG	Groundwater				TAL Metals and Nitroexplosives
HR-226Q-MW05	HR-226Q-MW05-GW-MR3005-REG	Groundwater				TAL Metals and Nitroexplosives
HR-227Q-MW01	HR-227Q-MW01-GW-MH3001-REG	Groundwater				TAL Metals and Nitroexplosives
HR-227Q-MW02	HR-227Q-MW02-GW-MH3002-REG	Groundwater				TAL Metals and Nitroexplosives
HR-227Q-MW03	HR-227Q-MW03-GW-MH3003-REG	Groundwater				TAL Metals and Nitroexplosives

[a] Groundwater samples will be collected from the approximate midpoint of the saturated screened interval of the monitoring well.

FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
REG - Field sample.
TAL - Target analyte list.

4.2.4.2 Sample Collection

Prior to sampling each monitoring well, static water level will be measured to define the groundwater flow in the residuum aquifer. Water level measurements will be performed as outlined in Section 4.18 of the SAP (IT, 2000a). Groundwater samples will be collected in accordance with the procedures outlined in Section 4.9.1.4 of the SAP.

Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP (IT, 2000a). The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.5 Surface Water Sampling

Sixteen surface water samples will be collected from Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. Surface water samples will be collected from the drainage ditches/creeks as shown on Figure 4-1.

4.2.5.1 Sample Locations and Rationales

The surface water sampling rationales are listed in Table 4-1. The surface water samples will be collected from the proposed locations on Figure 4-1. The surface water sample designations and QA/QC sample requirements are listed in Table 4-4. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

4.2.5.2 Sample Collection

The surface water samples will be collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

Table 4-4

Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
HR-224Q-SW/SD01	HR-224Q-SW/SD01-SW-QE2001-REG HR-224Q-SW/SD01-SD-QE1001-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-224Q-SW/SD02	HR-224Q-SW/SD02-SW-QE2002-REG HR-224Q-SW/SD02-SD-QE1002-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-224Q-SW/SD03	HR-224Q-SW/SD03-SW-QE2003-REG HR-224Q-SW/SD03-SD-QE1003-REG	Surface water sediment	a 0-0.5	HR-224Q-SW/SD03-SW-QE2004-FD HR-224Q-SW/SD03-SD-QE1004-FD			TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-224Q-SW/SD04	HR-224Q-SW/SD04-SW-QE2005-REG HR-224Q-SW/SD04-SD-QE1005-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-224Q-SW/SD05	HR-224Q-SW/SD05-SW-QE2006-REG HR-224Q-SW/SD05-SD-QE1006-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-224Q-SW/SD06	HR-224Q-SW/SD06-SW-QE2007-REG HR-224Q-SW/SD06-SD-QE1007-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-224Q-SW/SD07	HR-224Q-SW/SD07-SW-QE2008-REG HR-224Q-SW/SD07-SD-QE1008-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-226Q-SW/SD01	HR-226Q-SW/SD01-SW-MR2001-REG HR-226Q-SW/SD01-SD-MR1001-REG	Surface water sediment	a 0-0.5			HR-226Q-SW/SD01-SW-MR2001-MS/MSD HR-226Q-SW/SD01-SD-MR1001-MS/MSD	TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-226Q-SW/SD02	HR-226Q-SW/SD02-SW-MR2002-REG HR-226Q-SW/SD02-SD-MR1002-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-226Q-SW/SD03	HR-226Q-SW/SD03-SW-MR2003-REG HR-226Q-SW/SD03-SD-MR1003-REG	Surface water sediment	a 0-0.5	HR-226Q-SW/SD03-SW-MR2004-FD HR-226Q-SW/SD03-SD-MR1004-FD			TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-226Q-SW/SD04	HR-226Q-SW/SD04-SW-MR2005-REG HR-226Q-SW/SD04-SD-MR1005-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-226Q-SW/SD05	HR-226Q-SW/SD05-SW-MR2006-REG HR-226Q-SW/SD05-SD-MR1006-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-227Q-SW/SD01	HR-227Q-SW/SD01-SW-MH2001-REG HR-227Q-SW/SD01-SD-MH1001-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-227Q-SW/SD02	HR-227Q-SW/SD02-SW-MH2002-REG HR-227Q-SW/SD02-SD-MH1002-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-227Q-SW/SD03	HR-227Q-SW/SD03-SW-MH2003-REG HR-227Q-SW/SD03-SD-MH1003-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)
HR-227Q-SW/SD04	HR-227Q-SW/SD04-SW-MH2004-REG HR-227Q-SW/SD04-SD-MH1004-REG	Surface water sediment	a 0-0.5				TAL Metals and Nitroexplosives TOC, Grain Size (sediment only)

[a] Sample depth will depend on where sufficient first water is encountered to collect a water sample.

FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
HR-224Q-SW/SD07/HR-224Q
REG - Field sample.
TAL - Target analyte list.
TOC - Total organic carbon.

4.2.6 Sediment Sampling

Sixteen sediment samples will be collected from the site of Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. These sediment samples will be collected at the same locations as the surface water samples described in Section 4.2.5.

4.2.6.1 Sample Locations and Rationale

The proposed locations for the sediment samples are shown in Figure 4-1. Sediment sampling rationales are presented in Table 4-1. The sediment sample designations and QA/QC sample requirements are listed in Table 4-4. The actual sediment sample points will be at the discretion of the ecological sampler, based on the drainage pathways and actual field observations.

4.2.6.2 Sample Collection

The sediment samples will be collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. The sediment samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.3 Decontamination Requirements

Decontamination will be performed on sampling and nonsampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP (IT, 2000a). Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

4.4 Surveying of Sample Locations

All areas at this site must be cleared for UXO avoidance before any surveying activities will commence. Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum, 1983. Elevations will be referenced to the North American Vertical Datum of 1988.

Horizontal coordinates for soil, sediment, and surface water locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use permanent monitoring wells

to determine water levels, a higher level of accuracy is required. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP.

4.5 Analytical Program

Samples collected at locations specified in this chapter of this SFSP will be analyzed for the specific suites of chemicals and elements based on the history of site usage, as well as EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected from Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, consist of the following list of analytical suites:

- Target Analyte List Metals - Method 6010B/7000.
- Nitroexplosives - Method 8330.

In addition, the sediment samples will be analyzed for the following list of parameters:

- Total Organic Carbon - Method 9060
- Grain Size - ASTM D-421/D-422.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-5 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms and electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

4.6 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Section 4.13.2 of the SAP (IT, 2000a). Completed analysis request/COC records will be secured and included with each shipment of coolers to:

Table 4-5

Analytical Samples
Site Investigation
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples[a]					EMAX	QA Lab
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	Splits w/ QA Lab (0%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	Total No. Analysis	Total No. Analysis
Parcels 224Q, 226Q, and 227Q: 29 water matrix samples (13 groundwater samples and 16 surface water samples); **83 soil matrix samples** (35 surface soil samples, 32 subsurface soil samples, and 16 sediment samples)													
TAL Metals	6010B/7000	water	normal	29	1	29	3		1		4	38	0
Nitroexplosives	8330	water	normal	29	1	29	3		1		4	38	0
TAL Metals	6010B/7000	soil	normal	83	1	83	8		4		4	103	0
Nitroexplosives	8330	soil	normal	83	1	83	8		4		4	103	0
TOC	9060	sediment	normal	16	1	16	2		2		2	24	0
Grain Size	ASTM421/422	sediment	normal	16	1	16						16	0
Parcels 224Q, 226Q, and 227Q Subtotal:						256	24	0	12	0	18	322	0

[a]Field duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.

Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: EMAX Laboratories, Inc.
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 310-618-8889
Fax: 310-618-0818

ASTM- American Society for Testing and Materials.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
TAL - Target analyte list.
TOC - Total organic carbon.

Attn: Elizabeth McIntyre
EMAX Laboratories, Inc.
1835 205th Street
Torrance, California 90501
Telephone: (310) 618-8889.

4.7 Investigation-Derived Waste Management

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000a). The IDW generated at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, are expected to include decontamination fluids and disposable personal protective equipment. The IDW will be staged in the fenced area surrounding Buildings 335 and 336 while awaiting final disposal.

4.8 Site-Specific Safety and Health

Health and safety requirements for this SI are provided in the SSHP attachment for Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. The SSHP attachment will be used in conjunction with the installation-wide SHP.

5.0 Project Schedule

The project schedule for the SI activities will be provided by the IT Project Manager to the Base Realignment and Closure Cleanup Team and will be in accordance with the WP.

6.0 References

Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

Fort McClellan (FTMC), 1997, ***Fort McClellan Comprehensive Reuse Plan***, Fort McClellan Reuse and Redevelopment Authority of Alabama, prepared under contract to the Calhoun County Commission, November.

IT Corporation (IT), 2000a, ***Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, August.

IT Corporation (IT), 2000b, ***Final Human Health and Ecological Screening Values and PAH Background Summary Report***, July.

IT Corporation (IT), 1998, ***Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama***, August.

U.S. Army Corps of Engineers (USACE), 1999a, ***Archives Search Report, Maps, Fort McClellan, Anniston, Alabama***, July.

U.S. Army Corps of Engineers (USACE), 1999b, ***Statement of Work for Task Order CK10, Remedial Investigations (RIs) at the Chemical Warfare Material Sites, RIs at the Fuel/Training Areas, RIs at the Print Plants/Motor Pools, RIs at the Ground Scars/Boiler Plants, RI at Range 24A, Site Investigations (SIs) at the Historic Ranges, and a Groundwater Investigation at Rideout Field at Fort McClellan, Alabama***, June.

U.S. Army Corps of Engineers (USACE), 1994, ***Requirements for the Preparation of Sampling and Analysis Plan***, Engineer Manual EM 200-1-3, September 1.

U.S. Department of Agriculture (USDA), 1961, ***Soil Survey, Calhoun County, Alabama***, Soil Conservation Service, Series 1958, No. 9, September 1961.

U.S. Environmental Protection Agency (EPA), 1993, ***Data Quality Objectives Process for Superfund, Interim Final Guidance***, EPA 540-R-93-071, September.

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	silvex
3D	3D International Environmental Group
Abs	skin absorption
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
AEL	airborne exposure limit
AHA	ammunition holding area
AL	Alabama
amb.	amber
ANAD	Anniston Army Depot
APT	armor-piercing tracer
ARAR	applicable or relevant and appropriate requirement
ASP	ammunition supply point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AWWSB	Anniston Water Works and Sewer Board
‘B’	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCT	BRAC Cleanup Team
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BG	Bacillus globigii
bgs	below ground surface
BHC	betahexachlorocyclohexane
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BTAG	Biological Technical Assistance Group
BTEX	benzene, toluene, ethyl benzene, and xylenes
BTOC	below top of casing
BW	biological warfare
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
CCAL	continuing calibration
CCB	continuing calibration blank
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CG	carbonyl chloride (phosgene)
CFC	chlorofluorocarbon
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
Co-60	cobalt-60
COC	chain of custody; contaminant of concern
COE	Corps of Engineers
Con	skin or eye contact
COPC	contaminant of potential concern
COPEC	contaminant of potential environmental concern
CRL	certified reporting limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
D	duplicate; dilution
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEP	depositional soil
DI	deionized
DIMP	di-isopropylmethylphosphonate
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DOT	Department of Transportation
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
DWEL	drinking water equivalent level
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
EE/CA	engineering evaluation and cost analysis
Elev.	elevation
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ER	equipment rinsate
ESE	Environmental Science and Engineering, Inc.
ESV	ecological screening value
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank
FD	field duplicate
FedEx	Federal Express, Inc.
FFE	field flame expedient
Fil	filtered
Flt	filtered
FMP 1300	Former Motor Pool 1300
Foster Wheeler	Foster Wheeler Environmental Corporation
Frtn	fraction
FS	field split; feasibility study
ft	feet
ft/ft	feet per foot
FTA	Fire Training Area
FTMC	Fort McClellan
g	gram
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System

gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GS	ground scar
GSA	General Services Administration
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO_3	nitric acid
hr	hour
H&S	health and safety
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
'I'	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDM	investigative derived media
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
IMR	Iron Mountain Road
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IRDMIS	Installation Restoration Data Management Information System
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System ™
'J'	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
K	conductivity
L	lewisite; liter
LC_{50}	lethal concentration for 50 percent of population tested
LD_{50}	lethal dose for 50 percent of population tested
l	liter
LCS	laboratory control sample
LEL	lower explosive limit
LOAEL	lowest-observed-adverse-effects-level
LT	less than the certified reporting limit
max	maximum
MCL	maximum contaminant level
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
min	minimum
MINICAMS	miniature continuous air sampling system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MOGAS	motor vehicle gasoline
MPA	methyl phosphonic acid
MR	molasses residue
MS	matrix spike
mS/cm	millisiemens per centimeter
MSD	matrix spike duplicate
MTBE	methyl tertiary butyl ether
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
N/A	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NCP	National Contingency Plan
ND	not detected
NE	no evidence; northeast
NFA	No Further Action
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effects-level
NR	not requested; not recorded
ns	nanosecond
N-S	north to south
NS	not surveyed
nT	nanotesla
NTU	nephelometric turbidity unit
O&G	oil and grease
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
oz	ounce
PAH	polynuclear aromatic hydrocarbon
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
Pest.	pesticide
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PRG	preliminary remediation goals
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental Inc.

qty	quantity
Qual	qualifier
'R'	rejected; resample
RAO	removal action objective
RBC	EPA Region III Risk Based Concentration
RCRA	Resource Conservation and Recovery Act
RDX	cyclonite
ReB3	Rarden silty clay loams
REG	field sample
REL	recommended exposure limit
RFA	request for analysis
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SL	standing liquid
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	sump pump
Sr-90	strontium-90
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSSL	site-specific screening level
STB	supertropical bleach
STEL	short-term exposure limit
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TCA	trichloroethane
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofurans
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
'U'	not detected above reporting limit
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USACMLS	U.S. Army Chemical School
USAMPS	U.S. Army Military Police School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation

N/A – Not analyzed

ND – Not detected

Boolean Codes

- LT – Less than the certified reporting limit

Flagging Codes

- 9 – Non-demonstrated/validated method performed for USAEC
- B – Analyte found in the method blank or QC blank
- C – Analysis was confirmed
- D – Duplicate analysis
- I – Interfaces in sample make quantitation and/or identification to be suspicious
- J – Value is estimated
- K – Reported results are affected by interfaces or high background
- N – Tentatively identified compound (match greater than 70%)
- Q – Sample interference obscured peak of interest
- R – Non-target compound analyzed for but not detected (GC/MS methods)
- S – Non-target compound analyzed for and detected (GC/MS methods)
- T – Non-target compound analyzed for but not detected (non GC/MS methods)
- U – Analysis in unconfirmed
- Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

- J – The low-spike recovery is low
- N – The high-spike recovery is low
- R – Data is rejected

Final
Site-Specific Safety and Health Plan Attachments
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Prepared for:
U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street,
Mobile, Alabama 36602

Prepared by:

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

Task Order CK05
Contract No. DACA21-96-D-0018
IT Project No. 774645

June 2001

Revision 0

This Site-Specific Safety and Health Plan must be used in conjunction with the Installation-Wide Safety and Health Plan, Fort McClellan, Alabama.

Site-Specific Safety and Health Plan Attachment Approval
Fort McClellan, Calhoun County, Alabama

I have read and approve this site-specific safety and health plan attachment for the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, Fort McClellan, Calhoun County, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation procedures.

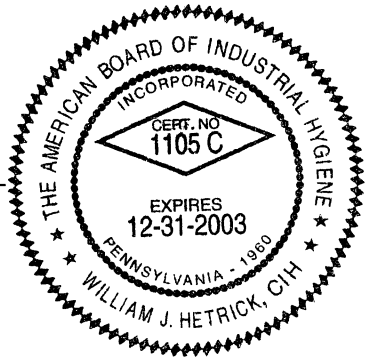
Stephen G. Moran for

Jeanne Yacoub, PE
Project Manager

06/06/01
Date

William J. Hetrick

William J. Hetrick
Health & Safety Manager



5/31/01
Date

Stephen G. Moran for

Jeff Tarr
Site Coordinator

6/6/01
Date

Acknowledgements

The approved version of this site-specific safety and health plan (SSHP) attachment for the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q Fort McClellan, Calhoun County, Alabama has been provided to the site coordinator. I acknowledge my responsibility to provide the site coordinator with the equipment, materials, and qualified personnel to implement fully all safety requirements in this SSHP attachment. I will formally review this plan with the health and safety staff every 6 months until project completion.

Stephen G. Moran for J. Jacob — 06/06/01

Project Manager — Date

I acknowledge receipt of this SSHP attachment from the project manager, and that it is my responsibility to explain its contents to all site personnel and cause these requirements to be fully implemented. Any change in conditions, scope of work, or other change that might affect worker safety requires me to notify the project manager and the health and safety manager.

Stephen G. Moran for J. Tarr — 06/06/01

Site Coordinator — Date

Site-Specific Safety and Health Plan
Acknowledgement Form

I have been informed of and will abide by the procedures set forth in this site-specific safety and health plan attachment for work activities on the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, Fort McClellan, Calhoun County, Alabama.

Printed Name	***Signature***	***Representing***	***Date***

Fort McClellan Gate Hours

Baltzell Gate	Baltzell Road. Open 24 hours daily, 7 days a week.
Galloway Gate	Galloway Road. Open 6:00 a.m. to 6:00 p.m., Monday-Friday.

Fort McClellan Project Emergency Contacts

Range Control Office (Main Post)	(256) 848-6772
Fire Department (on post)	911
Fire Department (off post)	(256) 237-3541
Ambulance (off post)	911
Regional Medical Center	(256) 235-5121
Military Police (SSG Busch)	(256) 848-5680, 848-4824
DOD Guard Force (Mr. Bolton)	(256) 848-5680, 848-4732
Anniston Police Department	(256) 238-1800
Chemical Agent Emergencies	(256) 895-1598
(Jimmy Walker, CEHNC)	cell phone (256) 759-3931
UXO Emergencies	(256) 895-1598
(Ken Barnett, CEHNC)	cell phone (256) 759-3931
UXO Non emergencies/Reporting Only (Ronald Levy)	(256) 848-3758
Baltzell Gate Guard Shack	(256) 848-5693, 848-3821
National Response Center & Terrorist Hotline	(800) 424-8802
Poison Control Center	(800) 462-0800
EPA Region IV	(404) 562-8725
Ronald Levy, Chief, FTMC Environmental Management	(256) 848-3758
Ellis Pope, U.S. Army Corps of Engineers	(334) 690-3077
Jeanne Yacoub, IT Project Manager	(770) 663-1429
Bill Hetrick, IT H&S Manager	(865) 690-3211, and pager (888) 655-9529
Mike Moore, Fort McClellan Safety Office	(256) 848-5433
Dr. Jerry H. Berke, Health Resources Occupational Physician	(800) 350-4511
Sergeant Tim Lane, National Guard Security Operations	(256) 848-6176

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FTMC	Fort McClellan
msl	mean sea level
PPE	personal protective equipment
SSHP	site-specific safety and health plan
UXO	unexploded ordnance

1.0 Site Work Plan Summary

1.1 Project Objective

The objective of this site investigation at the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, is to collect 35 surface soil samples, 32 subsurface soil samples, 13 groundwater samples, 16 surface water, and 16 sediment samples. These samples will be collected and analyzed for nitroexplosives, metals, and total organic carbon in sediment samples to determine whether potential site-specific chemicals are present and to provide data for characterizing the site to determine the environmental conditions and to determine if any further action is to be conducted at the site. Additionally, samples will be collected from environmental media in locations that will assist in the assessment of potential ecological impacts resulting from previous activities at the site.

1.2 Project Tasks

- Surface and downhole unexploded ordnance (UXO) survey
- Utility clearances
- Surface and subsurface soil sampling
- Surface water and sediment sampling
- Installation of permanent monitoring wells
- Groundwater sampling
- Surveying.

1.3 Personnel Requirements

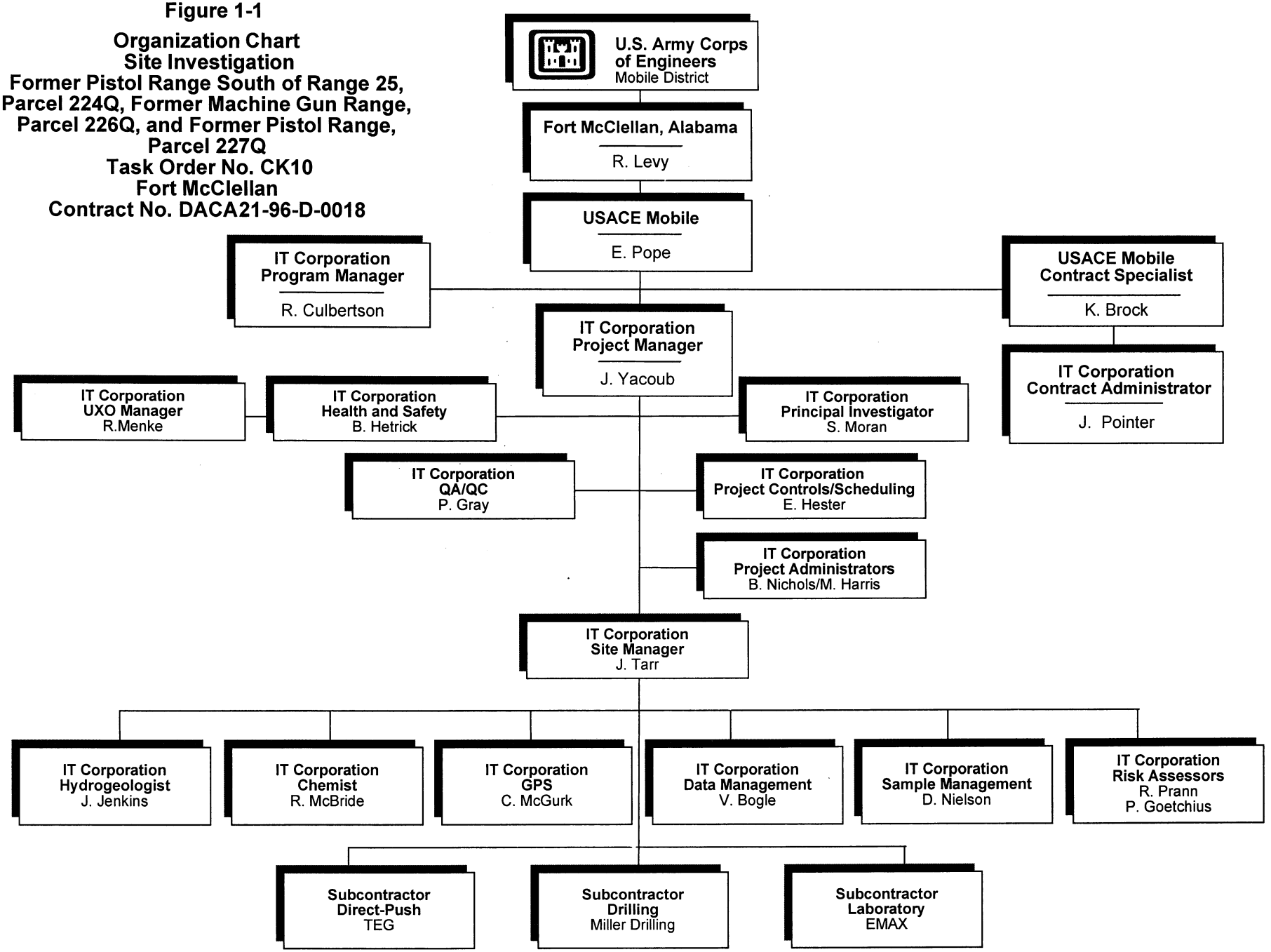
Up to 15 employees are anticipated for this scope of work. See Figure 1-1 for an organization chart.

Note: All personnel on this site will have received training, informational programs, and medical surveillance as outlined in the installation-wide safety and health plan for site investigations at FTMC and will be familiar with the requirements of this site-specific safety and health plan (SSHP).

This SSHP must be used in conjunction with the installation-wide safety and health plan, Fort McClellan (FTMC), Alabama.

Figure 1-1

Organization Chart
Site Investigation
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Task Order No. CK10
Fort McClellan
Contract No. DACA21-96-D-0018



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2.0 Site Characterization and Analysis

2.1 Anticipated Hazards

The activity hazard analysis in Chapter 5.0 contains project-specific practices utilized to reduce or eliminate anticipated site hazards. The activity hazard analysis indicates specific chemical and physical hazards that may be present and encountered during each task from on-site operations. Below each task is a list of hazards and specific actions that will be taken to control the respective hazards. These control measures may include work practice controls, engineering controls, and/or use of appropriate personal protective equipment (PPE). Site control with the use of specific work zones (support zone, contamination reduction zone, and exclusion zone) is addressed in Chapter 7.0 of Appendix A of the IT Corporation (IT), August 2000a, *Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama.*

The Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, fall within the "Possible Artillery Impact Areas" shown on Plate 10 of the U.S. Army Corps of Engineers July 1999 *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama.* Therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities for these site investigations. The surface sweeps and downhole surveys will be performed to identify anomalies for the purpose of UXO avoidance.

Detailed site descriptions of each of the sites to be investigated can be found in Chapter 1.0 of the site-specific field sampling plan and should be reviewed to supplement this SSHP. Potential contaminant sources at the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, are primarily unknown, but may include nitroexplosives and metals. Lead in soil will be the most likely metal encountered if live fire was conducted at the ranges. Engineering controls (dust suppression) will be required where site activities generate visible dust emissions from vehicle and equipment operations performed off established roadways and within the surface danger zone or range fan firing direction and impact areas as described in the site-specific field sampling plan, environmental baseline survey, and the archive search reports.

Procedures contained in the site-specific UXO safety Plan shall be followed for all site activities associated with this investigation.

Table 2-1 contains the toxicological properties of chemicals anticipated or to be used at the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q.

2.2 General Site Information

Location of Site. FTMC is located in the foothills of the Appalachian Mountains of northeastern Alabama near the cities of Anniston and Weaver in Calhoun County. FTMC is approximately 60 miles northeast of Birmingham, 75 miles northwest of Auburn, and 95 miles west of Atlanta, Georgia. FTMC consists of three main areas of government-owned and leased properties: Main Post, Pelham Range, and Choccolocco Corridor (lease terminated in May 1998). The area of study for this site investigation, located in the east-central area of the Main Post, is bordered by Bains Gap Road on the north, Snap Lane on the east and southeast, Coal Lane on the southwest, and Iron Mountain Road on the west. These ranges and impact areas extend beyond the boundaries of the defined study area for this site investigation. However, the area surrounding the study area on the north, east, and south will be included in the Baby Bains Gap Road engineering evaluation/cost analysis investigation that will include Ranges 20, 23, 25, 26, and 29. The impact areas for Parcels 224Q, 226Q, and 227Q that fall in the areas of these ranges will be investigated in the Baby Bains Gap Road engineering evaluation/cost analysis.

Duration of Planned Employee Activity. Employee activity duration is anticipated to be less than two months.

Site Topography and Size. The Parcel 224Q boundary is approximately 375 feet by 675 feet (Environmental Science and Engineering, Inc. [ESE], 1998). From aerial photographs taken in 1944, Former Pistol Range South of Range 25 appears as a large clearing surrounded by sparse ground vegetation. The overall elevation ranges from approximately 825 to 845 feet mean sea level (msl) with ground surface slopes to the southeast.

The Former Machine Gun Range, Parcel 226Q, is identified on the 1946 Reservation Map south of Range 25. The 1946 Reservation Map is the only documentation of this range (ESE, 1998). The parcel boundary extends in a fan shape to the southeast toward current Range 23. The elevation of the Former Machine Gun Range, Parcel 226Q, ranges from approximately 825 to 845 feet msl in the study area.

Table 2-1

Toxicological Properties of Chemicals
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Acetone [67-64-1]	9.7	13□100	Inh Ing Con	Irritated eyes, nose, and throat; headache, dizziness; dermatitis.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	750 ppm 750 ppm 250 ppm	1,000 ppm 1,000 ppm	PEL TLV REL	20,000 ppm
Fuel oil (diesel oil, medium)	NA	NA	Ing Inh Con	Ingestion causes nausea, vomiting, and cramps; depressed central nervous system, headache, coma, death; pulmonary irritation; kidney and liver damage. Aspiration causes severe lung irritation, coughing, gagging, dyspnea, substernal stress, pulmonary edema; broncho-pneumonia; excited, then depressed, central nervous system.	Eye: Irrigate promptly Skin: Soap wash Breath: Respiratory support Swallow: Immediate medical attention Aspiration: Immediate medical attention	100 mg/m^3* 100 mg/m^3** *skin **kerosene only	--	PEL TLV REL	--

Table 2-1

Toxicological Properties of Chemicals
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Gasoline [8006-61-9]	?	0.3	Inh Ing Con	Intoxication, headaches, blurred vision, dizziness, nausea; eye, nose, throat irritation; potential kidney and other cancers. Carcinogenic.	Eye: Irrigate immediately (15 min) Skin: Soap wash promptly Breath: Respiratory support Swallow: Immediate medical attention	300 ppm 300 ppm Ca, lowest feasible conc. (LOQ 15 ppm)	500 ppm 500 ppm	PEL TLV REL	1400 ppm (10% LEL)
Lead [7439-92-1]	N/A	N/A	Inh Ing Con	Lightheadedness; nausea, headache; numbness of the extremities, muscular weakness; irritation of the eyes and nose; dermatitis; chemical pneumonia; giddiness.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	0.050 mg/m^3 0.050 mg/m^3 0.100 mg/m^3	--	PEL TLV REL	100 mg/m^3
Isopropyl alcohol (isopropanol) [67-63-0]	10.16	43□200	Inh Ing Con	Mild irritation of the eyes, nose, and throat; drowsiness, dizziness, headache; dry, cracked skin.	Eye: Irrigate immediately Skin: Water flush Breath: Respiratory support Swallow: Immediate medical attention	400 ppm 400 ppm 400 ppm	500 ppm 500 ppm 500 ppm	PEL TLV REL	2,000 ppm (10% LEL)
Motor Oil [NA]	NA	NA	Inh Ing	Irritated eyes, skin, respiratory system; usually only a problem if misted or ingested.	Eye: Irrigate immediately (15 min) Skin: Soap wash immediately Swallow: Immediate medical attention	NA	NA	PEL TLV REL	--
Nitric acid [7697-37-2]	11.95	0.3□1	Inh Ing Con	Irritated eyes, mucous membranes, and skin; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion.	Eye: Irrigate immediately Skin: Water flush promptly Breath: Respiratory support Swallow: Immediate medical attention	2 ppm 2 ppm 2 ppm	4 ppm 4 ppm 4 ppm	PEL TLV REL	25ppm

Table 2-1

Toxicological Properties of Chemicals
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Substance [CAS]	IP[a] (eV)	Odor Threshold (ppm)	Route[b]	Symptoms of Exposure	Treatment	TWA[c]	STEL[d]	Source[e]	IDLH (NIOSH)[f]
Portland cement [65997-15-1]	NA	NA	Inh	Fine gray powder that can be irritating if inhaled or in eyes.	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	5 mg/m^3 respirable fraction 15 mg/m^3 total dust 10 mg/m^3 10 mg/m^3/ total dust		PEL TLV REL	5000 mg/m^3
Sodium hydroxide [1310-73-2]	NA	NA	Inh Ing Con	Irritated nose; pneumonitis; burns eyes and skin; temporary loss of hair.	Eye: Irrigate immediately Skin: Water flush immediately Breath: Respiratory support Swallow: Immediate medical attention	2 mg/m^3 C 2 mg/m^3 C 2 mg/m^3		PEL TLV REL	10 mg/m^3

[a]IP = Ionization potential (electron volts).
[b]Route = Inh, Inhalation; Abs, Skin absorption; Ing, Ingestion; Con, Skin and/or eye contact.
[c]TWA = Time-weighted average. The TWA concentration for a normal work day (usually 8 or 10 hours) and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.
[d]STEL = Short-term exposure limit. A 15-minute TWA exposure that should not be exceeded at any time during a workday, even if the TWA is not exceeded.
[e]PEL = Occupational Safety and Health Administration (OSHA) permissible exposure limit (29 CFR 1910.1000, Table Z).
AEL = Airborne Exposure Limit.
TLV = American Conference of Governmental Industrial Hygiene (ACGIH) threshold limit value□TWA.
REL = National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit.
[f]IDLH (NIOSH)□Immediately dangerous to life or health (NIOSH). Represents the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
NE = No evidence could be found for the existence of an IDLH (NIOSH Pocket Guide to Chemical Hazards, Pub. 1998).
C = Ceiling limit value which should not be exceeded at any time.
Ca = Carcinogen.
CAS = Chemical Abstract Services.
NA = Not applicable.
? = Unknown.
LEL = Lower explosive limits.
LC_{50} = Lethal concentration for 50 percent of population tested.
LD_{50} = Lethal dose for 50 percent of population tested.

Table 2-1

Toxicological Properties of Chemicals
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

LOQ = limit of quantification.
NIC = Notice of intended change (ACGIH).

References:

American Conference of Governmental Industrial Hygienists Guide to Occupational Exposure Values, 1998, compiled by the American Conference of Governmental Industrial Hygienists.
Amoore, J. E. Hautula, "Odor as an Aid to Chemical Safety," Journal of Applied Toxicology, 1983.
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Documentation of TLVs and BEIs, American Conference of Governmental Industrial Hygienists, 6th ed., 1998.
Fazzuluri, F. A., Compilation of Odor and Taste Threshold Values Data, American Society for Testing and Materials, 1978.
Gemet, L. J. Van, Compilation of Odor Threshold Values in Air and Water, CIVO, Netherlands, 1977.
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Lewis, Richard J., Sr., 1992, Sax's Dangerous Properties of Industrial Materials, 8th ed., Van Nostrand Reinhold, New York.
Micromedex Tomes Plus (R) System, 1992, Micromedex, Inc.
National Institute for Occupational Safety and Health Pocket Guide to Chemicals, Pub. 1998, National Institute for Occupational Safety and Health.
Odor Threshold for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Association, 1989.
Respirator Selection Guide, 3M Occupational Health and Safety Division, 1993.
Verschuseren, K., Handbook of Environmental Data on Organic Chemicals, Van Nostrand and Reinhold, 1977.
Warning Properties of Industrial Chemicals□Occupational Health Resource Center, Oregon Lung Association.
Workplace Environmental Exposure Levels, American Industrial Hygiene Association, 1992.

The Former Pistol Range Parcel 227Q, was also identified on the 1946 Reservation Map at Range 23. Aerial photographs from 1944 show the firing line area as a rectangular-shaped clearing on the western end of the parcel. The parcel boundary extends to the east toward Range 23 in a fan shape. The elevation of the Former Pistol Range, Parcel 227Q, ranges from approximately 840 to 870 feet msl in the study area.

Pathways for Hazardous Substance Dispersion. Possible pathways for hazardous substances in the area are soils and groundwater.

3.0 Personal Protective Equipment

The work activities will begin in the following levels of protection. Also, a completed description of Level D, Modified Level D, and Level C PPE is provided.

Task	Initial Level of PPE
Initial UXO avoidance sweep and equipment staging	Level D
Utility clearance	Level D
Surface water, sediment, and surface soil sampling	Level D
Subsurface soil and groundwater sampling	Modified Level D*
Monitoring well installation	Modified Level D*
Surveying	Level D

*Initial level will be raised to Level C or higher if air monitoring results in the breathing zone are greater than action levels.

3.1 Level D

The minimal level of protection that will be required of IT Corporation personnel at the site will be Level D. The following equipment will be used for Level D protection:

- Coveralls or work clothing
- Leather work gloves (when necessary)
- Steel-toed safety boots
- Safety glasses
- Hard hat
- Hearing protection (when working near or adjacent to operating equipment).

3.2 Modified Level D

The following equipment will be used for Modified Level D protection:

- Permeable Tyvek®, Kleenguard®, or its equivalent

- Latex boot covers
- Nitrile, heavy work, or latex gloves
- Steel-toed safety boots
- Safety glasses
- Hard hat
- Hearing protection (when working near or adjacent to operating equipment).

Note: In addition to Modified Level D PPE, the operator of high-pressure water jetting equipment shall wear metatarsal guards for protection of the legs and feet and a face shield for protection from splashes.

3.3 Level C

Level C protection will not be used unless air monitoring data indicate the need for upgrade; however, the equipment shall be readily available on site. The following equipment will be used for Level C protection:

- National Institute of Occupational Safety and Health/Mine Safety and Health Administration-approved full-face, air-purifying respirators equipped with organic vapor/acid gas cartridge in combination with high-efficiency particulate air filter
- Hooded, Saran®-coated Tyvek, taped at gloves, boots, and respirator
- Nitrile gloves (outer)
- Latex or lightweight nitrile gloves (inner)
- Neoprene steel-toed boots or polyvinyl chloride overbooties/steel-toed safety boots
- Hard hat
- Hearing protection (when working near or adjacent to operating equipment).

Note: In addition to Level C PPE, the operator of high pressure water jetting equipment shall wear metatarsal guards for protection of the legs and feet and a face shield for protection from splashes.

4.0 Site Monitoring

The environmental contaminants of concern resulting from activities at the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q are primarily unknown, but based on land use history, probably include nitroexplosives and metals.

Table 4-1 contains action levels for site monitoring at the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q.

4.1 Chemical

The site safety and health officer or task geologist will perform air monitoring during the performance of site activities and ground intrusive operations. A calibrated photoionization detector (i.e., Hnu DL-101 or equivalent) organic vapor analyzer will be utilized to monitor the sampling locations and breathing zones to determine if any organic material may be present that would necessitate upgrading of the protection level. A calibrated combustible gas/oxygen indicator will be utilized to monitor the borehole, work areas, and breathing zones to determine if any combustible/flammable levels may be present that would necessitate evacuation of the work area. A Miniram PDM-3 or equivalent aerosol monitor shall be used to monitor airborne dust since metals and lead are of potential concern. Table 4-2 contains the air monitoring frequency and location for site monitoring at the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q.

4.2 Unexploded Ordnance

UXO support for sampling activities are specified in the site-specific UXO safety plan developed for the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. The UXO specialists will perform UXO avoidance sweeps prior to moving the heavy equipment onto the site. During this operation, UXO on the surface will be detected and marked for avoidance during field operations. Additionally, downhole magnetometer surveys will be performed to detect metal objects in the path of sampling equipment or boring apparatus. The sampling/boring location will be moved to avoid subsurface metal objects. The practice of UXO avoidance shall be implemented for all intrusive activities associated with well construction and completion. If UXO is encountered,

Table 4-1

Action Levels
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

When in Level C PPE

Analyte	Action Level	Required Action[a]
VOCs (volatile organic compound)	≥ 10 ppm above background in breathing zone (BZ)	Stop work, evacuate work area, upgrade to Level B, Notify certified industrial hygienist (CIH).
Oxygen	≥ 20%, ≤23% < 20%, >23%	Normal operations. Stop work, evacuate work area, Notify CIH.
Flammable vapors	≥ 10% lower explosive limit (LEL) < 10% LEL	Stop work, evacuate work area. Notify CIH Continue operations, monitor for VOCs.
Dust	≥ 0.5 mg/m^3 above background in BZ	Normal operations, initiate dust control.

When in Level D/Modified/Level D PPE

Analyte	Action Level	Required Action[b]
VOCs	≥ 5 ppm above background in BZ	Stop activities, suspend work activities for 15 to 30 minutes. If readings are sustained, then upgrade to Level C PPE. Notify CIH.
Oxygen	≥ 20%, ≤23% < 20%, >23%	Normal operations. Stop work, evacuate work area. Notify CIH.
Flammable vapors	≥ 10% LEL < 10% LEL	Stop work, evacuate work area. Notify CIH. Continue operations, monitor for VOCs.

Table 4-1

Action Levels
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Analyte	Action Level	Required Action[b]
Dust	> 0.5 mg/m^3 above background in BZ	Stop work, initiate dust control. Upgrade to Level C PPE if dust control is not effective; Notify CIH

When in Support Zone

Analyte	Action Level	Required Action
VOCs	≥ 1 ppm above background in BZ	Evacuate support zone and re-establish perimeter of exclusion zone.
Dust	> 0.5 mg/m^3 above background in BZ	Stop work, initiate dust control.

[a] Four instantaneous peaks in any 15-minute period or a sustained reading for 5 minutes in excess of the action level will trigger a response.

[b] Contact with the health and safety manager must be made prior to continuance of work. The health and safety manager may then initiate perimeter/integrated air sampling along with additional engineering controls..

No one is permitted to downgrade levels of PPE without authorization from the health and safety manager.

Table 4-2

Air Monitoring Frequency and Location
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and
Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Work Activity	Instrument	Frequency	Location
Staging equipment	OV Monitor Miniram	Initially for area Continuously	Breathing zone (BZ) of employees
Sampling (groundwater, subsurface soil, and sediment)	OV Monitor LEL/O_2 Monitor Miniram	Continuously Periodically Periodically	BZ of employees Support zone BZ of employees
Installing monitoring wells	OV Monitor LEL/O2 Monitor Miniram	Continuously Continuously Continuously	BZ of employees BZ of employees BZ of employees

OV = Organic vapor.
LEL/O_2 = Lower explosive level/oxygen.

personnel will contact the site manager and UXO specialist immediately. Personnel will evacuate the immediate area and secure it.

5.0 Activity Hazard Analysis

The attached activity hazard analysis (Table 5-1) is provided for the following activities:

- Initial UXO avoidance sweep and equipment staging
- Installation of monitoring wells
- Subsurface soil, groundwater, surface water, and sediment sampling
- Surveying
- Moving and shipping collected samples
- Disposal of investigation-derived waste (forklift operations)
- High-pressure water jetting operations.

All injuries and illnesses must be immediately reported to the site manager or the site safety and health officer, who will then notify off-site personnel and organizations as necessary.

If hospital care must be provided, the victim will be treated at Northeast Regional Medical Center. Directions to the hospital are provided in Figure 5-1.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Initial UXO avoidance sweep and equipment staging	Slip, trip, and fall hazards	• Determine best access route before transporting equipment. • Practice good housekeeping; keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards. • Look before you step; ensure safe and secure footing.
	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment.
	Falling objects	• Stay alert and clear of materials suspended overhead; wear hard hat and steel-toed boots.
	Flying debris, dirt, dust, etc.	• Wear safety glasses/goggles; ensure that eye wash is in proper working condition.
	Pinch points	• Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Cuts/bruises	• Use cotton or leather work gloves for material handling.
	Bees, spiders, and snakes	• Inspect work area carefully and avoid placing hands and feet into concealed areas.
	Ticks	• Wear light-colored clothing (can see ticks better). • Mow vegetated and small brush areas. • Wear insect repellant. • Wear long sleeves and long pants. • Visually check oneself promptly and frequently after exiting the work area.
	Fire	• Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Hazard communication	• Label all containers as to contents and dispose of properly. • Ensure Material Safety Data Sheets (MSDS) are available for hazardous chemicals used on site.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Initial UXO avoidance sweep and equipment staging (continued)	Noise	• Sound levels above 85 decibels (dBA) mandates hearing protection.
	Lighting	• Adequate lighting will be provided to ensure a safe working environment.
	Cold stress	• Workers should wear insulated clothing when temperatures drop below 40 degrees Fahrenheit (°F). • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing.
	Poison ivy/oak/sumac	• Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Heat rash	• Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	• Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area.
	Heat exhaustion	• Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature). • Set up work/rest periods. • Use the "buddy system." • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Initial UXO avoidance sweep and equipment staging (continued)	Heat stroke	• Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body-cooling devices.
	Contact with moving equipment/vehicles	• Work area will be barricaded/demarcated. • Equipment will be laid out in an area free of traffic flow. • Barricades shall be used on or around work areas when it is necessary to prevent the inadvertent intrusion of pedestrian traffic. • Barriers shall be used to protect workers from vehicular traffic. • Barriers shall be used to guard excavations adjacent to streets or roadways. • Flagging shall be used for the short term (less than 24 hours) to identify hazards until proper barricades or barriers are provided. • Heavy equipment shall have backup alarms.
	Forklift operations	• Use qualified and trained forklift operators. • The operator shall not exceed the load capacity rating for the forklift. • The load capacity shall be clearly visible on the forklift. • Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.
	Portable electric tools	• Portable electric tools that are unsafe due to faulty plugs, damaged cords, or other reasons, shall be tagged (do not use) and removed from service. • Portable electric tools and all cord-and plug-connected equipment shall be protected by a ground-fault circuit interrupter (GFCI) device. • Electrical tools shall be inspected daily prior to use.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Initial UXO avoidance sweep and equipment staging (continued)	Extension cords	• Extension cords that have faulty plugs, damaged insulation, or are unsafe in any way shall be removed from service. • Cords shall be protected from damage from sharp edges, projections, pinch points (doorways), and vehicular traffic. • Cords shall be suspended with a nonconductive support (rope, plastic ties, etc.). • Cords shall be designed for hard duty. • Cords shall be inspected daily.
	Lightning strikes	• Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one. • Keep all body parts in contact with the ground as close as possible. • Remain 6 feet away from tree trunk if seeking shelter beneath tree(s). • If in a group, keep 6 feet of distance between people.
	Thunderstorms, tornados	• Listen to radio or TV announcements for pending weather information. • Cease field activities during thunderstorm or tornado warnings. • Seek shelter. Do not try to outrun a tornado.
Surveying	Slip, trip, and fall hazards	• Site workers will be required to wear hard hat, safety glasses with side shields, work gloves, and steel-toed boots when working in the field. • Provide adequate lighting in all work areas. • Whenever possible, avoid routing cords and hoses across walking pathways. • Flag or cover inconspicuous holes to protect against falls. • Work areas will be kept clean and orderly. • Garbage and trash will be disposed of daily in approved refuse containers. • Tools and accessories will be properly maintained and stored. • Work areas and floors will be kept free of dirt, grease, and slippery materials.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Surveying (continued)	Traffic accidents	• Place physical barrier (i.e., barricades, fencing) around work areas regularly occupied by pedestrians. • If working adjacent to roadways, have workers wear fluorescent orange vests. • Use warning signs or lights to alert oncoming traffic. • Assign flag person(s) if necessary to direct local traffic. • Set up temporary parking locations outside the immediate work area. • Motor vehicle operators will obey all posted traffic signs, signals, and speed limits. • Pedestrians have the right-of-way. • Wear seat belts when vehicles are in motion.
	Wildlife hazards	• Workers should be cautious when driving through the site in order to avoid encounters with passing animals.
	Biological hazards	• When walking through overgrown grass areas, watch for snakes (rattlesnakes, moccasins, copperheads).
	Ticks	• Wear light-colored clothing (can see ticks better). • Mow vegetated and small brush areas. • Wear insect repellant. • Wear long sleeves and long pants. • Visually check oneself promptly and frequently after exiting the work area.
	Poison ivy/oak/sumac	• Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	UXO	• UXO avoidance monitoring will be conducted by a UXO specialist prior to beginning activities. • If UXO is encountered, cease all activities, mark the location, and notify the site manager.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Groundwater Sampling	Cross contamination and contact with potentially contaminated materials	• Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Avoid skin contact with water. • Handle samples with care. • Only essential personnel will be in the work area. • Real-time air monitoring will take place before and during sampling activities. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Cut hazards	• Use care when handling glassware. • Wear adequate hand protection.
	Hazard communication	• MSDSs shall be obtained for chemicals brought on site. • Label all containers as to contents.
	Strains/sprains	• Use the proper tool for the job being performed. • Get assistance if needed. • Avoid twisting/turning while pulling on tools, moving equipment, etc.
	Spills/residual materials	• Absorbent material and containers will be kept available where leaks or spills may occur.
	Lighting	• Adequate lighting will be provided to ensure a safe working environment.
	Unattended worker	• Use "buddy system" - visual contact will be maintained with the sampling technician during sampling activities.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Soil Boring and Surface/Subsurface Sampling	Cross contamination and contact with potentially contaminated materials	• Stop immediately at any sign of obstruction. • Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Only essential personnel will be in the work area. • Real-time air monitoring will take place before and during sampling activities. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Cut hazards	• Use care when handling glassware. • Wear adequate hand protection.
	Slip, trip, and fall hazards	• Site workers will be required to wear hard hat, safety glasses with side shields, work gloves, and steel-toed/shank boots when working in the field. • Whenever possible, avoid routing cords and hoses across walking pathways. • Flag or cover inconspicuous holes to protect against falls.
	Bees, spiders, and snakes	• Workers shall inspect the work area carefully and avoid placing hands and feet into concealed areas. • Evaluate need for sensitive workers to have prescribed antibiotics or medicine to combat onset of symptoms.
	Poison ivy/oak/sumac	• Avoid plant areas if possible. • Wear long sleeves and long pants. • Promptly wash clothing that has contacted poisonous plants. • Wash affected areas immediately with soap and water.
	Cold stress	• Workers should wear insulated clothing when temperatures drop below 40°F. • Drink warm beverages on breaks. Refrain from drinking caffeinated beverages. • Remove wet clothing promptly. • Take breaks in warm areas. • Reduce work periods as necessary. • Layer work clothing.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Soil Boring and Surface/Subsurface Sampling (continued)	Access/egress hazards	• Use qualified and trained bushhog operator. • Keep employees out of the bushhog work area. • Utilize good housekeeping practices. • Keep aisleways, pathways, and work areas free of obstruction. • Clean ice or snow off of walkways or work stations. • Use appropriate footwear for the task assigned.
	Heat rash	• Keep the skin clean and dry. • Change perspiration-soaked clothing, as necessary. • Bathe at end of work shift or day. • Apply powder to affected area.
	Heat cramps	• Drink plenty of cool fluids even when not thirsty. • Provide cool fluid for work crews. • Move victim to shaded, cool area.
	Heat exhaustion	• Conduct physiological worker monitoring as needed (i.e., heart rate, oral temperature). • Set up work/rest periods. • Use the buddy system. • Allow workers time to acclimate. • Have ice packs available for use. • Take frequent breaks.
	Heat stroke	• Evaluate possibility of night work. • Perform physiological monitoring on workers during breaks. • Wear body-cooling devices.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Soil Boring and Surface/Subsurface Sampling (continued)	Lightning strikes	• Whenever possible, halt activities and take cover. • If outdoors, stay low to the ground. • Limit the body surface area that is in contact with the ground (i.e., kneeling on one knee is better than laying on the ground). • Seek shelter in a building if possible. • Stay away from windows. • If available, crouch under a group of trees instead of one single tree. • Keep all body parts in contact with the ground as close as possible. • If in a group, keep 6 feet of distance between people.
	UXO	• UXO avoidance monitoring will be conducted by a UXO specialist prior to beginning activities. • If UXO is encountered, cease all activities, mark the location, and notify the site manager and UXO specialist.
Moving and Shipping Collected Samples	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.
	Pinch points	• Keep hands, fingers, and feet clear of moving/suspended materials and equipment. • Beware of contact points. • Stay alert at all times!
	Cut hazards	• Wear adequate hand protection. Use care when handling glassware.
	Hazard communication	• Label all containers as to contents and associated hazards.
	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Material Storage	Flammable and combustible liquids	• Store in NO SMOKING AREA. • Fire extinguisher readily available. • Transfer only when properly grounded and bonded.
Disposal of Investigation-Derived Waste (Forklift Operation)	Personnel injury, property damage, and/or equipment damage	• Use qualified and trained forklift operators. • The operator shall not exceed the load capacity rating for the forklift. • The load capacity shall be clearly visible on the forklift. • Forklift operators shall inform their supervisor of any prescribed medication that they are taking that would impair their judgement.
	Cross contamination and contact with potentially contaminated materials	• Stop immediately at any sign of obstruction. • Sampling technicians will wear proper protective clothing and equipment to safeguard against potential contamination. • Only essential personnel will be in the work area. • Real-time air monitoring will take place before and during sampling activities. • All personnel will follow good hygiene practices. • Proper decontamination procedures will be followed. • All liquids and materials used for decontamination will be contained and disposed of in accordance with federal, state, and local regulations.
	Cut hazards	• Use care when handling glassware. • Wear adequate hand protection.
High-Pressure Water Jetting Operations	Heavy lifting	• Use proper lifting techniques. • Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.
	Slip, trip, and fall hazards	• Good housekeeping shall be implemented. • The work area shall be kept clean as feasible. • Inspect the work area for slip, trip, and fall hazards.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
High-Pressure Water Jetting Operations (continued)	Fueling	• Only approved safety cans shall be used to store fuel. • Do not refuel equipment while it is operating. • Fire extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.
	Faulty or damaged equipment	• Equipment shall be inspected before being placed into service and at the beginning of each shift. • Preventive maintenance procedures recommended by the manufacturer shall be followed. • A lockout/tagout procedure shall be used for equipment found to be faulty or undergoing maintenance.
	High pressure water	• Jetting gun operator must wear appropriate PPE including hard hat, impact-resistant safety glasses with side shields, water-resistant clothing, metatarsal guards for feet and legs, and hearing protection (if appropriate). • One standby person will be available within the vicinity of the pump during jetting operation. • The work area shall be isolated and adequate barriers will be used to warn other site personnel.
	Unqualified operators	• Only qualified and trained personnel are permitted to operate machinery and mechanized equipment associated with water jet cutting and cleaning.
	Out-of-control equipment	• No machinery or equipment is permitted to run unattended. • Machinery or equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
	Noise	• Sound levels above 85 dBA mandates hearing protection by nearby site personnel.
	Activation during repairs	• All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done.
	Pinch points	• Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert and clear of materials suspended .
	Falling objects	• Hard hats are required by site personnel. • Stay alert and clear of material suspended overhead.
	Flying debris	• Impact-resistant safety glasses with side shields are required.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
High-Pressure Water Jetting Operations (continued)	Contact with potentially contaminated materials	• All site personnel will wear the appropriate PPE.
Drilling and Installation of Monitoring Wells	Overhead hazards	• Make sure no obstacles are within radius of boom. Always stay a safe distance from power lines.
	Faulty or damaged equipment being utilized to perform work	• All machinery or mechanized equipment will be inspected by a competent mechanic and be certified to be in safe operating condition. • Equipment will be inspected before being put to use and at the beginning of each shift. • Faulty/unsafe equipment will be tagged and if possible locked out. • Drill rigs will be equipped with a reverse signal alarm and backup warning lights, or the vehicle is backed up only when an observer signals it is safe to do so.
	Uneven terrain, poor ground support, inadequate clearances, contact with utilities	• Inspections or determinations of road conditions and structures will be made in advance to ensure that clearances and load capacities are safe for the passage or placing of any machinery or equipment. • All mobile equipment and areas in which they are operated shall be adequately illuminated. • Aboveground and belowground utilities will be located prior to staging equipment. • Whenever the equipment is parked, the parking brake shall be set. • Equipment parked on inclines will have the wheels chocked. • Inspect brakes and tire pressure on drill rig before staging for work.
	Inexperienced operator	• Machinery and mechanized equipment shall be operated only be designated personnel. • Operators shall inform their supervisor(s) of any prescribed medication that they are taking that would impair their judgment.
	Jacks/outriggers	• Ensure proper footing and cribbing.
	Falling objects	• Remove unsecured tools and materials before raising or lowering the derrick. • Stay alert and clear of materials suspended overhead.
	Pinch points	• Keep feet and hands clear of moving/suspended materials and equipment. • Stay alert at all times!

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Drilling and Installation of Monitoring Wells (continued)	Fire	• Mechanized equipment will be shut down prior to and during fueling operations. • Have fire extinguishers inspected and readily available.
	Fall hazards	• Personnel are not allowed to work off of machinery or use them as ladders. • Use fall protection when working above 6 feet.
	Contact with rotating or reciprocating machine parts	• Use machine guards; use long-handled shovels to remove auger cuttings. • Safe lockout procedures for maintenance work.
	Heavy lifting	• Use proper lifting techniques. Lifts greater than 60 pounds require assistance or mechanical equipment; size up the lift.
	Slip, trip, and fall hazards	• Practice good housekeeping, keep work area picked up and clean as feasible. • Continually inspect the work area for slip, trip, and fall hazards.
	Contact with potentially contaminated materials	• Real-time air monitoring will take place. If necessary, proper personal protective clothing and equipment will be utilized. • Stop immediately at any sign of obstruction. • Do not breathe air surrounding the boring unless necessary. • Upgrade to respirator if necessary. • Avoid skin contact with soil cuttings. Wear gloves. • Stay clear of moving parts of drill rig.
	Drum handling	• Be careful not to breathe air from around open drum any more than necessary. Monitor with photoionizaton detector/flame ionization detector (PID/FID) equipment and upgrade to respirator if necessary. • When filling a drum (with either soil or water), be careful not to make contact with the contained waste. Wear appropriate gloves. Make sure lid or bung of drum is secure. • If moving a drum unassisted, be sure to leverage properly, use proper lifting techniques, and wear safety glasses and steel-toed boots. • When using a drum dolly, make sure straps and lid catch are securely attached. Leverage properly when tilting drum. Be sure toes stay away from drum.

Table 5-1

Activity Hazard Analysis
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Calhoun County, Alabama

Activity	Potential Hazards	Recommended Controls
Drilling and Installation of Monitoring Wells (continued)	UXO	• UXO avoidance monitoring will be conducted by a UXO specialist prior to beginning activities. • UXO avoidance monitoring will apply to all intrusive activities associated with well construction completion. • If UXO is encountered, cease all activities, mark the location, and notify the site manager and UXO specialist immediately.

DRAFT. CHCK. BY:
ENGR. CHCK. BY: J. RAGSDALE
INITIATOR: J. RAGSDALE
PROJ. MGR.: J. YACOUB
DRAWN BY: D. BOMAR
STARTING DATE: 04/02/01
DATE LAST REV.:
DRAWN BY:
DWG. NO.: ...\796887es.182
PROJ. NO.: 796887
05/10/01 08:50:40 AM
DBILLING
c:\cadd\design\796887es.182

PELHAM RANGE

MAIN POST

CHOCCOLOCCO CORRIDOR

GALLOWAY GATE (OPEN 6am-6pm M-F)

BALTZELL GATE (OPEN)

BAKER GATE (CLOSED)

SUMMERAL GATE (CLOSED)

PARCELS 224Q, 226Q AND 227Q

NORTHEAST ALABAMA REGIONAL MEDICAL CENTER

LEGEND:

- ROUTE TO NORTHEAST ALABAMA REGIONAL MEDICAL CENTER
- U.S. HIGHWAY
- HOSPITALS
- INVESTIGATION SITE

DRIVING DIRECTIONS FROM BALTZELL GATE ROAD TO THE NORTHEAST ALABAMA MEDICAL CENTER

- LEAVING FORT MCCLELLAN ON BALTZELL GATE ROAD, TURN LEFT (SOUTH) ONTO AL HWY 21
- GO ~ 2.5 MILES WHERE AL HWY 21 MERGES WITH U.S. HWY 431 AND CONTINUE SOUTH
- CONTINUE SOUTH ON AL21/US431 FOR ~ 2.7 MILES
- TURN LEFT ONTO EAST 10th STREET
- GO ~ 0.2 MILE TO MEDICAL CENTER ON RIGHT
- NORTHEAST ALABAMA REGIONAL MEDICAL CENTER, 400 EAST 10 TH STREET
- PHONE NUMBER : (256) 235-5121

SCALE
0 8000 16000 FEET

FIGURE 5-1
HOSPITAL EMERGENCY ROUTE

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

ATTACHMENT I

MATERIAL SAFETY DATA SHEETS

DOD Hazardous Materials Information System
DoD 6050.5-L
AS OF July 1998

FSC: 9650
NIIN: 00F047010
Manufacturer's CAGE: 2H104
Part No. Indicator: A
Part Number/Trade Name: ALL SHOTSHELL AMMUNITION & 8 GAL IND.

General Information

Item Name:
Company's Name: REMINGTON ARMS CO INC SUB OF E I DUPONT DE NEMOURS
Company's Street: INTERSTATE 1-40 AND REMINGTON RD
Company's P. O. Box: N/K
Company's City: LONOKE
Company's State: AR
Company's Country: US
Company's Zip Code: 72086-5000
Company's Emerg Ph #: 919-299-4032
Company's Info Ph #: 919-299-4032
Distributor/Vendor # 1:
Distributor/Vendor # 1 Cage:
Distributor/Vendor # 2:
Distributor/Vendor # 2 Cage:
Distributor/Vendor # 3:
Distributor/Vendor # 3 Cage:
Distributor/Vendor # 4:
Distributor/Vendor # 4 Cage:
Safety Data Action Code:
Safety Focal Point: F
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 15MAR91
Safety Data Review Date: 28MAR96
Supply Item Manager:
MSDS Preparer's Name: W G BELL
Preparer's Company: REMINGTON ARMS CO INC SUB OF E I DUPONT
Preparer's St Or P. O. Box: INTERSTATE 1-40 AND REMINGTON RD
Preparer's City: LONOKE
Preparer's State: AR
Preparer's Zip Code: 72086-5000
Other MSDS Number:
MSDS Serial Number: BZCDQ
Specification Number:
Spec Type, Grade, Class:
Hazard Characteristic Code:
Unit Of Issue:
Unit Of Issue Container Qty:
Type Of Container:
Net Unit Weight:

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NRC/State License Number:
Net Explosive Weight:
Net Propellant Weight-Ammo:
Coast Guard Ammunition Code:

Ingredients/Identity Information

==========
Proprietary: NO
Ingredient: LEAD, INORGANIC LEAD (IARC CARC GROUP 2B) *96-1*
Ingredient Sequence Number: 01
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: F
NIOSH (RTECS) Number: OF7525000
CAS Number: 7439-92-1
OSHA PEL: N/K
ACGIH TLV: 0.15 MG/CUM
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: LEAD COMPOUNDS,INORGANIC
Ingredient Sequence Number: 02
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: F
NIOSH (RTECS) Number: 1000827LI
CAS Number:
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ARSENIC, ARSENICALS (HUMAN CARCINOGEN BY IARC, ANIMAL CARCINOGEN BY IARC - GROUP 1; CONFIRMED CARCINOGEN BY NTP) *95-4*
Ingredient Sequence Number: 03
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: F
NIOSH (RTECS) Number: CG0525000
CAS Number: 7440-38-2
OSHA PEL: 0.5 MG/CUM
ACGIH TLV: 0.2 MG/CUM
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ARSENIC COMPOUND
Ingredient Sequence Number: 04
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: F
NIOSH (RTECS) Number: 1001249AC
CAS Number:
OSHA PEL: N/K

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ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ANTIMONY
Ingredient Sequence Number: 05
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: F
NIOSH (RTECS) Number: CC4025000
CAS Number: 7440-36-0

OSHA PEL: 0.5 MG/CUM
ACGIH TLV: 0.5 MG/CUM
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: ANTIMONY COMPOUND
Ingredient Sequence Number: 06
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: F
NIOSH (RTECS) Number: 1001599AC
CAS Number:
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: BARIUM (SOLUBLE COMPOUNDS) *95-4*
Ingredient Sequence Number: 07
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: F
NIOSH (RTECS) Number: CQ8370000
CAS Number: 7440-39-3
OSHA PEL: 0.5 MG/CUM
ACGIH TLV: 0.5 MG/CUM
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: BARIUM COMPOUND
Ingredient Sequence Number: 08
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: F
NIOSH (RTECS) Number: 1006925BC
CAS Number:
OSHA PEL: N/K
ACGIH TLV: N/K
Other Recommended Limit: N/K

Proprietary: NO
Ingredient: NITROGLYCERINE, NITRIN, NITROL

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Ingredient Sequence Number: 09
Percent: N/K
Ingredient Action Code:
Ingredient Focal Point: F
NIOSH (RTECS) Number: QX2100000
CAS Number: 55-63-0
OSHA PEL: 2 MG/CUM (SKIN)
ACGIH TLV: 0.46 MG/CUM
Other Recommended Limit: 0.05 PPM
==========
Physical/Chemical Characteristics
==========
Appearance And Odor: GRAYISH, GRAY, SILVERY MATERIAL-NO ODOR
Boiling Point: N/R
Melting Point: N/R
Vapor Pressure (MM Hg/70 F): N/R

Vapor Density (Air=1): N/R
Specific Gravity: N/R
Decomposition Temperature: N/K
Evaporation Rate And Ref: N/R
Solubility In Water: N/K
Percent Volatiles By Volume: N/K
Viscosity:
pH: N/K
Radioactivity:
Form (Radioactive Matl):
Magnetism (Milligauss):
Corrosion Rate (IPY): N/K
Autoignition Temperature:

Fire and Explosion Hazard Data

Flash Point: N/R
Flash Point Method: N/P
Lower Explosive Limit: N/R
Upper Explosive Limit: N/R
Extinguishing Media: WATER
Special Fire Fighting Proc: EVACUATE IMMEDIATE AREA & DELUGE W/WATER, WEAR PROTECTIVE CLOTHING FOR SHRAPNEL. MATERIAL IS SELF OXIDIZING; FLOOD W/ WATER TO FIGHT FIRE & COOL SHELLS.
Unusual Fire And Expl Hazrds: SHELLS WILL DETONATE WHEN EXPOSED TO FLAME & HIGH TEMPS.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): FLAMES, SPARKS, HIGH TEMPS ABOVE 266F.
Materials To Avoid: STRONG MINERAL ACIDS & ALKALIS.
Hazardous Decomp Products: OXIDES OF CARBON, NITROGEN & LEAD FUMES.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): HEAT, FIRE, STATIC, FRICTION & PERCUSSION.

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Health Hazard Data

LD50-LC50 Mixture:
Route Of Entry - Inhalation: NO
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ANEMIA, FATIGUE, NOCTORIA, EMBRYOTOXIN, WEAKNESS, MENTAL CONFUSION, PALLOR, HEADACHE, NAUSEA, CUTS & ABRASIONS.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: SEE INGREDIENTS.
Signs/Symptoms Of Overexp: ANEMIA, FATIGUE, NOCTORIA, EMBRYOTOXIN, WEAKNESS, MENTAL CONFUSION, PALLOR, HEADACHE, NAUSEA, CUTS & ABRASIONS.
Med Cond Aggravated By Exp: GI TRACT, KIDNEYS, BLOOD & CNS.
Emergency/First Aid Proc: SKIN: FLUSH W/WATER. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: USE NON-SPARKING EQUIPMENT TO CLEANUP & STORE SHELLS-AVOID IGNITION SOURCES.

Neutralizing Agent: N/K
Waste Disposal Method: MATERIAL MAY BE BURNED IAW/FEDERAL, STATE & LOCAL REGULATIONS. UN0012.
Precautions-Handling/Storing: USE NON-SPARKING EQUIPMENT TO CLEANUP & STORE SHELLS-AVOID IGNITION SOURCES. USE HEARING PROTECTION WHEN DISCHARGING CARTRIDGES.
Other Precautions: LABEL CONTAINERS-ORM D; WEAR GLOVES & SHRAPNEL PROTECTION.

Control Measures

Respiratory Protection: USE SCBA IF FUMES ARE PRESENT.
Ventilation: NOT REQUIRED
Protective Gloves: N/R
Eye Protection: SAFETY GLASSES WHEN SHOOTING.
Other Protective Equipment: USE HEARING PROTECTION WHEN DISCHARGING CARTRIDGES.
Work Hygienic Practices:
Suppl. Safety & Health Data:

Transportation Data

Transportation Action Code:
Transportation Focal Point:
Trans Data Review Date:
DOT PSN Code:
DOT Symbol:
DOT Proper Shipping Name:
DOT Class:
DOT ID Number:

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DOT Pack Group:
DOT Label:
DOT/DoD Exemption Number:
IMO PSN Code:
IMO Proper Shipping Name:
IMO Regulations Page Number:
IMO UN Number:
IMO UN Class:
IMO Subsidiary Risk Label:
IATA PSN Code:
IATA UN ID Number:
IATA Proper Shipping Name:
IATA UN Class:
IATA Subsidiary Risk Class:
IATA Label:
AFI PSN Code:
AFI Symbols:
AFI Prop. Shipping Name:
AFI Class:
AFI ID Number:
AFI Pack Group:
AFI Label:
AFI Special Prov:
AFI Basic Pac Ref:
MMAC Code:
N.O.S. Shipping Name:
Additional Trans Data:

Disposal Data

Disposal Data Action Code:
Disposal Data Focal Point:
Disposal Data Review Date:
Rec # For This Disp Entry:
Tot Disp Entries Per NSN:
Landfill Ban Item:
Disposal Supplemental Data:
1st EPA Haz Wst Code New:
1st EPA Haz Wst Name New:
1st EPA Haz Wst Char New:
1st EPA Acute Hazard New:
2nd EPA Haz Wst Code New:
2nd EPA Haz Wst Name New:
2nd EPA Haz Wst Char New:
2nd EPA Acute Hazard New:
3rd EPA Haz Wst Code New:
3rd EPA Haz Wst Name New:
3rd EPA Haz Wst Char New:
3rd EPA Acute Hazard New:

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Label Data

Label Required: YES
Technical Review Date:
Label Date:
MFR Label Number:
Label Status: G
Common Name: ALL SHOTSHELL AMMUNITION & 8 GAL IND.
Chronic Hazard: N/P
Signal Word:
Acute Health Hazard-None:
Acute Health Hazard-Slight:
Acute Health Hazard-Moderate:
Acute Health Hazard-Severe:
Contact Hazard-None:
Contact Hazard-Slight:
Contact Hazard-Moderate:
Contact Hazard-Severe:
Fire Hazard-None:
Fire Hazard-Slight:
Fire Hazard-Moderate:
Fire Hazard-Severe:
Reactivity Hazard-None:
Reactivity Hazard-Slight:
Reactivity Hazard-Moderate:
Reactivity Hazard-Severe:
Special Hazard Precautions: ANEMIA, FATIGUE, NOCTORIA, EMBRYOTOXIN, WEAKNESS, MENTAL CONFUSION, PALLOR, HEADACHE, NAUSEA, CUTS & ABRASIONS. ANEMIA, FATIGUE, NOCTORIA, EMBRYOTOXIN, WEAKNESS, MENTAL CONFUSION, PALLOR, HEADACHE, NAUSEA, CUTS & ABRASIONS.
Protect Eye:
Protect Skin:
Protect Respiratory:
Label Name: REMINGTON ARMS CO INC SUB OF E I DUPONT DE NEMOURS
Label Street: INTERSTATE 1-40 AND REMINGTON RD

Label P.O. Box: N/K
Label City: LONOKE
Label State: AR
Label Zip Code: 72086-5000
Label Country: US
Label Emergency Number: 919-299-4032
Year Procured:

Final
Site-Specific Unexploded Ordnance Safety Plan Attachment Site Investigation at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, at Fort McClellan, Calhoun County, Alabama

Prepared for:

U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street
Mobile, Alabama 36602

Prepared by:

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

Task Order CK10
Contract No. DACA21-96-D-0018
IT Project No. 796887

June 2001

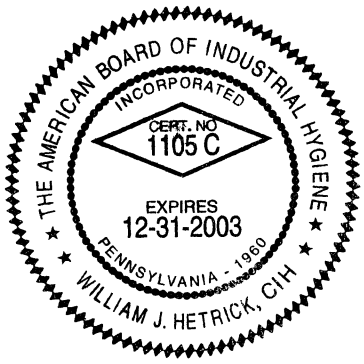
Revision 0

Final
Site-Specific Unexploded Ordnance Safety Plan Attachment Site Investigation at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q

I have read and approve this site-specific unexploded ordnance (UXO) safety plan attachment for Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q at Fort McClellan, Alabama, with respect to project hazards, regulatory requirements, and IT Corporation UXO procedures.

Robert W. Hickman, Jr.
UXO Technical Manager

8 Jun 01
Date



William J. Hetrick, CIH
Health & Safety Manager

5/31/01
Date

Table of Contents

List of Acronyms

See Attachment 1, List of Abbreviations and Acronyms, of the Site-Specific Field Sampling Plan Attachment contained in this binder.

1.0 Introduction

This document defines anomaly avoidance procedures for activities to be performed by IT Corporation (IT) unexploded ordnance (UXO) personnel in conjunction with the site investigation at the Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, at Fort McClellan (FTMC), Calhoun County, Alabama. This document is not a stand-alone document; it must be used in conjunction with the *FTMC UXO Supplementary Procedures* (IT, 2001), attached as Attachment 1.

IT UXO personnel will perform visual surveys, assisted by hand-held magnetometers and metal detectors, to support the collection of surface soil, subsurface soil, groundwater, surface water, and sediment samples for chemical analysis at Parcel 224Q, Parcel 226Q and Parcel 227Q. The purpose is to avoid any ordnance or explosives (OE) during hazardous, toxic, and radioactive waste (HTRW) sampling activities. Intrusive anomaly investigation is not authorized for this site work.

The area of study for this site investigation, located in the east-central area of the Main Post of FTMC, is bordered by Bains Gap Road on the north, Snap Lane on the east and southeast, Coal Lane on the southwest, and Iron Mountain Road on the west. The Environmental Science and Engineering, Inc., January 1998, *Final Environmental Baseline Survey, Fort McClellan, Alabama*, (EBS) identifies the following three ranges in this study:

- Former Pistol Range South of Range 25, Parcel 224Q
- Former Machine Gun Range, Parcel 226Q
- Former Pistol Range, Parcel 227Q.

These ranges and impact areas extend beyond the boundaries of the defined study area for this SI. However, the area surrounding the study area on the north, east and south will be included in the Baby Bains Gap Road engineering evaluation/cost analysis (EE/CA) investigation that will include Ranges 20, 23, 25, 26, and 29. The impact areas for Parcels 224Q, 226Q, and 227Q that fall in the areas of these ranges will be investigated in the Baby Bains Gap Road EE/CA.

Parcel 224Q was identified on the 1937 General Map of FTMC as a pistol range south of Range 25 (Environmental Science and Engineering [ESE], 1998). The surface danger zone, or range fan, was not identified for Parcel 224Q, and the direction of fire is unknown. The firing direction

for the range was likely to the east or to the south and is probably within the study area for this SI. There is a berm that extends northeast-southwest across the western boundary of the parcel. This berm may have been the backstop for the range. The impact area would not likely be to the north because of the location of Range 25, which dates back to 1937. Also, the direction of fire would not likely be to the west toward the main cantonment.

Former Machine Gun Range, Parcel 226Q, is identified on the 1946 Reservation Map south of Range 25. The direction of fire, based on the range fan presented in the EBS, was to the southeast. The 1946 Reservation Map is the only documentation of this range. The parcel boundary extends in a fan shape to the southeast toward current Range 23. There is not any other information available regarding this range, dates of use, or operation (ESE, 1998).

Former Pistol Range, Parcel 227Q, also is identified on the 1946 Reservation Map, as Range 23. The direction of fire was nearly due east, according to Figure 2 of the EBS. Pistol ranges are identified in this general area on other maps, according to the EBS. Aerial photographs from 1944 show the area for the firing line as a rectangular-shaped clearing on the western end of the parcel. Ingram Creek transects Former Pistol Range, Parcel 227Q, flowing to the northwest. The parcel boundary extends in a fan shape to the east toward Range 23. The impact area for Parcel 226Q, as shown in Figure 2 of the EBS (ESE, 1998), appears to be to the southeast, beyond the study area for this SI and in the impact area for recent Range 23 and the Baby Bains Gap Road EE/CA study area. There is not any other information available regarding this range or its operation.

In addition to the ranges described in the EBS for the study area, ten ranges (areas) were shown on Plates 4, 5, 6, and 10 of the U.S. Army Corps of Engineers July 1999 *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (ASR). These ranges were not described in the EBS or shown on any of the EBS figures. Most of the additional ranges from the ASR map plates that are located in the study area are not described or named in the ASR. Each of the plates in the ASR represents a different time period of range use at Fort McClellan.

Both the EBS-defined ranges (Parcels 224Q, 226Q, and 227Q) and the range shapes shown on the ASR plates within this study area will be investigated. Impact areas outside the study area for this SI will be investigated as part of the Baby Bains Gap Road EE/CA.

Specifically, IT will collect 35 surface soil samples, 32 subsurface soil samples, 13 groundwater samples, 16 surface water samples, and 16 sediment samples at this site. Potential contaminant sources at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, are primarily unknown but may include nitroexplosives and lead. Chemical analyses of the samples collected during the field program will include nitroexplosives and metals. In addition, sediment samples will be analyzed for total organic carbon and grain size. Results from these analyses will be compared with site-specific screening levels and ecological screening values presented in the IT July 2000 *Final Human Health and Ecological Screening Values and PAH Background Summary Report,* and regulatory agency guidelines.

Each of the parcels to be investigated under this plan was used for small arms range training areas. While no OE hazard would normally be expected at a small arms training area, portions of Parcels 224Q, 226Q, and 227Q fall within the "Possible Artillery Impact Areas" shown on Plate 10 of the U.S. Army Corps of Engineers July 1999 *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama.* Therefore, unexploded ordnance (UXO) surface sweeps and downhole surveys of soil borings will be required to support field activities at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

2.0 UXO Team Composition

UXO team and personnel requirements will be in accordance with EP 75-1-2 (USACE, 2000) and installation-wide sampling and analysis plan (SAP) (IT, 2000b) for FTMC. A UXO team will be on site during all sampling or intrusive activities where OE is suspected.

3.0 Responsibilities

The UXO Team Leader is responsible for ensuring that personnel performing UXO tasks at FTMC have the required qualifications. The UXO Team Leader supervises and coordinates UXO work activities.

The UXO team member(s) will provide UXO avoidance, explosive ordnance recognition, location, and safety functions for IT employees and any subcontractors during sampling activities. Sampling activities at this site include surface and subsurface soil sampling, drilling and installation of monitoring wells, sampling of monitoring wells, surface water and sediment sampling, survey of sample points, and safe access and egress to and from the site in support of HTRW operations.

4.0 Authority

UXO personnel are authorized to perform UXO avoidance activities only. UXO personnel are not permitted to initiate OE investigative or disposal activities.

5.0 UXO Avoidance Procedures to Support HTRW Sampling Activities at FTMC

The scope of work for site investigation activities at Parcels 224Q, 226Q and 227Q, include the following UXO tasks:

- Provide UXO avoidance support during the collection of 35 surface soil samples, 32 subsurface soil samples, 13 groundwater samples, 16 surface water samples, and 16 sediment samples. Sample locations are defined in Section 4.0 of the Site-Specific Field Sampling Plan attachment contained in this binder.

- Provide downhole UXO support for all intrusive drilling to determine buried downhole hazards.

- Provide UXO surveys for all intrusive field activities (e.g., digging, fence-post driving, grading, or excavation).

Since these areas may contain OE contamination, the UXO team must conduct a surface access survey for UXO before any type of activities commence. This includes foot and vehicular traffic. UXO avoidance activities at Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q, will include:

a) Access Corridors and Sampling Sites

(1) The UXO team will conduct access surveys of the footpaths and vehicular lanes approaching and leaving each of the investigation sites. Access surveys will begin in a known clear area and proceed by the most direct route to the sampling site. The boundaries of the access route and sampling site will be marked with white tape or white pin flags.

(2) If an OE item is found during the survey, the location will be conspicuously marked with a red pin flag and avoided by altering the route. Additionally, UXO personnel will complete the IT FTMC "Unexploded Ordnance Report Form." Subsurface anomalies will be marked with a yellow flag.

(3) The boundaries of the access route and sampling site will be recorded in the IT FTMC "UXO Sketch Log" by the UXO technician. Additionally, anomaly locations will be recorded on this form.

(4) Instrumentation used at this site will include the Schonstedt GA 72, the CST Corporation Magna-Trak 102, or Whites Spectrum XLT Metal Detector. Additionally, the Schonstedt MG-220 or MG-230 will be set up for downhole monitoring. All equipment will be operated as specified in the appropriate operator's manual. All equipment will be function tested prior to use following the procedure in paragraph 3.2, *FTMC UXO Supplementary Procedures* (IT, 2001), and the operator's instructions. The Whites Metal Detector will be used in conjunction with hand-held magnetometers in areas of high concentrations of rocks with a magnetic signature to assist in eliminating anomalies created by "hot rocks."

(5) The access route will be twice as wide as the widest vehicle that will use the route. Footpath lanes will be a minimum of three feet wide.

(6) If surface OE or subsurface anomalies are encountered that cannot be avoided, the access route must be diverted to avoid contact. No personnel will be allowed outside of the surveyed areas without a UXO escort. No unescorted access is permitted inside the corridor area until a survey has been completed and boundaries established.

(7) At the actual investigation site, the UXO team must also complete a survey of an area sufficient to support mechanical excavation equipment maneuverability, parking of support vehicles, and establishment of decontamination stations. As a minimum, the surveyed area should have a dimension in all directions equal to twice the length of the largest vehicle

or piece of equipment to be brought on site. White pin flags or tape will be used to mark the boundaries of the surveyed site.

(8) Surface soil samples are normally collected at depths of 0 to 12 inches below ground surface. The UXO team will survey the area of the soil sampling site for any indication of OE. Sampling is not permitted at any location where an anomaly has been detected.

(9) Tracked or other vehicles whose movement would disturb the soil are authorized for use only in areas that have been surveyed and in which no anomalies have been detected.

(10) If grading or soil movement is required to support access corridor development or a sampling location, UXO personnel will perform a survey. After an area has been surveyed and no anomalies have been detected, soil can be removed at a rate of no more than one foot per lift. If additional grading is required, another survey will be performed after each one foot of soil has been removed.

(11) Erosion and weathering will typically cause some OE items to leach to the surface or otherwise be uncovered. In cases where access corridors or sampling sites have not been surveyed or traversed for a period of time, additional surveys may be required. The decision regarding the performance of follow-on surveys will be made by the site superintendent with input provided by the FTMC UXO Safety Officer and FTMC UXO Team Leader. The decision will be based on such factors as: the amount of time since the last survey was performed, the weather during this period, the terrain in the area of concern; the former use of the area, and, the type or quantity of OE found during initial surveys.

(12) Incremental geophysical surveys at drill hole locations will be initially accomplished using a hand auger to install a pilot hole. An access survey of the immediate vicinity of the pilot hole location will precede the installation of the pilot hole. The UXO team will use a manual or mechanical portable auger to install the pilot hole. The augured hole will be inspected for anomalies with a geophysical instrument (configured for downhole utilization) in two-foot increments as the hole is advanced below ground surface. The pilot hole will also be inspected with the geophysical instrument upon reaching the final depth of the hand augered hole, providing a total clearance depth equal to pilot hole depth plus two feet. If the proposed site is still free of magnetic anomalies, the drilling equipment may be brought on site and utilized. Hand augering of a hole will not proceed if an anomaly is detected that cannot be positively identified as inert material. If a suspect OE item is encountered, the sampling personnel must select a new drill hole location. The UXO team

will continue to inspect the drill hole for anomalies at two-foot increments as the drilling is advanced from the clearance depth of the pilot hole until a depth of 12 feet is reached.

b) Vegetation Removal

In cases where large trees or other vegetation removal is required to support access or sampling operations, the procedures in paragraph 4.2, *FTMC UXO Supplementary Procedures*, will be followed (IT, 2001).

c) Magnetometer/Metal Detector Checkout and Field Procedures

The procedures in paragraph 3.0, *FTMC UXO Supplementary Procedures*, will be followed (IT, 2001). Since portions of Parcel 224Q, Parcel 226Q, and Parcel 227Q have been identified as a possible artillery impact area, the function test will utilize the function test ordnance that most closely approximates the 37mm and 75mm projectiles.

d) UXO Logbooks and Documentation

All UXO personnel identified in paragraph 5.0, *FTMC UXO Supplementary Procedures* (IT, 2001), will maintain a logbook in accordance with that procedure.

6.0 Safety

In addition to the requirements of the site-specific safety and health plan prepared for this site, the UXO personnel will ensure the following:

a) During the access and subsurface surveys conducted with a geophysical instrument, the UXO team members will not wear safety shoes or other footwear that would cause the instrument to present a false response.

b) The UXO team will not be required to wear protective helmets unless an overhead hazard is present.

c) The FTMC UXO Safety Officer will monitor UXO activities to ensure compliance with applicable safety requirements.

d) The FTMC UXO Safety Officer will certify that all FTMC UXO workers are capable of performing UXO activities at FTMC based on observation of work performance.

e) The FTMC UXO Safety Officer is responsible for all site-specific UXO training.

f) The UXO technician on site will advise project personnel regarding all evacuation and/or exclusion zones as appropriate. The UXO technician will monitor all sampling site activities to ensure that only the minimum number of personnel are present on site.

7.0 Quality

The IT FTMC UXO Quality Control Officer will follow quality control instructions and procedures listed in Section 9.0 of the installation-wide OE management plan contained in the SAP (IT, 2000b) appropriate to this task and the *FTMC UXO Supplementary Procedures* (IT, 2001). The IT FTMC UXO Quality Control Officer will also utilize the "UXO Avoidance Quality Control Report" to document his activities. Copies of this form will be provided to the IT quality assurance representative upon request.

8.0 References

Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

IT Corporation (IT), 2001, ***Fort McClellan Unexploded Ordnance Supplementary Procedures***, May.

IT Corporation (IT), 2000a, ***Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama***, July.

IT Corporation (IT), 2000b, ***Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, March.

U.S. Army Corps of Engineers, Engineering Publication, EP 75-1-2, 2000, ***Unexploded Ordnance (UXO) Support During Hazardous, Toxic, and Radiological (HTRW) and Construction Activities,*** 20 November.

U.S. Army Corps of Engineers (USACE), 1999 ***Archives Search Report, Maps, Fort McClellan, Anniston Alabama***, July.

ATTACHMENT 1

FORT MCCLELLAN UNEXPLODED ORDNANCE SUPPLEMENTARY PROCEDURES

FTMC UXO SUPPLEMENTARY PROCEDURES

Subject: Ordnance and Explosives

1.0 INTRODUCTION

IT Corporation (IT) has been retained by the U.S. Army Corps of Engineers-Mobile District, under Contract Number DACA21-96-D-0018, to provide environmental services related to Base realignment and closure (BRAC) of Fort McClellan, Alabama. The Installation-Wide Ordnance and Explosives (OE) Management Plan for Fort McClellan (FTMC) was prepared by IT Corporation and submitted as a final document in March 2000. The Installation-Wide OE Management Plan was prepared to provide general guidance for conducting unexploded ordnance (UXO) work associated with hazardous, toxic, and radiological waste (HTRW) investigations and remedial activities currently in progress at FTMC. IT Corporation prepares site-specific field sampling, health and safety, and UXO safety plans for sites where fieldwork will occur that may potentially contain OE. A UXO Safety Plan is not prepared for sites that are not reported to be in areas containing OE.

1.1 Purpose

This document is intended to provide procedures to the field staff that outline UXO operations and clarify activities currently permitted under "anomaly avoidance." The document is not intended to replace any of the project documents currently approved; rather, it is intended to complement those documents with additional information that allows successful completion of the job.

2.0 FTMC EMPLOYEE ORIENTATION/TRAINING AND CERTIFICATION

The IT FTMC orientation program is designed to:

- Indoctrinate new employees to FTMC-unique procedures
- Verify compliance with regulatory certification requirements
- Provide continuing instruction and updating in UXO fundamentals to sustain readiness to safely perform UXO tasks

2.1 Responsibilities

The IT OE Service Center Operations Manager will oversee the training programs and maintain a master record of UXO employee training and certification status.

The UXO person designated as the senior IT UXO individual at FTMC will schedule the orientation listed below.

The FTMC UXO Safety Officer will:

- Conduct all UXO-specific orientation and training at FTMC
- Certify that each new UXO employee is capable of performing UXO work activities at FTMC
- Maintain FTMC training files and records on each UXO technician on site reflecting his or her current training status.

2.2 UXO Employee Orientation

Every UXO employee assigned to FTMC will receive a site-specific UXO orientation in addition to training required by the Occupational Health and Safety Administration (OSHA). This orientation will include, as a minimum, the following topics:

- Local emergency response drills and procedures
- Personal protective equipment (PPE) and personnel decontamination procedures
- Ordnance recognition/UXO expected to be encountered at FTMC
- Equipment safety
- FTMC site orientation
- Chemical warfare material (CWM) awareness and procedures
- Communications procedures
- FTMC Logbook/data recording procedures
- IT administrative policies and procedures
- Magnetometer checkout procedures.

Upon completion of the UXO employee orientation, the FTMC UXO Safety Officer will monitor the performance of the new hire for at least three workdays while conducting typical UXO activities. The FTMC UXO Safety Officer will

then certify that the individual is capable of performing UXO activities at FTMC based upon satisfactory performance of the three-day period. A copy of this certification will be maintained in the individual's site FTMC training file (see example at Attachment 1).

2.3 UXO Sustainment Training

All UXO technicians have had the OSHA 40-hour hazardous waste operations and emergency response (HAZWOPER) course in order to be initially certified at FTMC. They are also required to maintain the certification with an 8-hour OSHA refresher course on an annual basis. Additionally, all IT FTMC UXO personnel will have 8 hours of site-specific annual UXO sustainment training. This training can be performed incrementally (2 hours every quarter) at the discretion of the site superintendent in coordination with the FTMC IT UXO Safety Officer. Topics will include, but are not limited to, the following subjects:

- Site-specific environmental hazards
- Site-specific UXO hazards, ordnance fuzing, functioning and precautions
- Topics which the IT UXO Team Leader or IT Safety UXO Officer determines necessary to support FTMC UXO activities

Sustainment training will be conducted for a period of no less than 8 hours. Daily safety briefings, tailgate safety meetings, and other required site-specific training are not a substitute for this training. The purpose of this training is to provide each UXO employee with site-specific UXO training over and above OSHA requirements. The site-specific UXO training will be recorded in the project file and the UXO employee's personnel file.

3.0 FTMC MAGNETOMETER/METAL DETECTOR FUNCTION TEST AND FIELD PROCEDURES

This section provides FTMC magnetometer/metal detector function tests and operating procedures to be employed at all work sites that have been identified as requiring avoidance support.

3.1 Geophysical Test Plot

The purpose of a test plot is to provide a consistent environment where the equipment can be evaluated. The location of the geophysical test plot will be inside the IT compound. It will be established as follows

- The test plot will consist of an area approximately 20 x 20 feet and clear of vegetation and magnetic anomalies, located in the IT compound next to the southeast end of the office trailers.

- Five metal test objects will be buried at depths varying from 6 inches to 24 inches. The objects will approximate the weight, diameter, and length of an MK 2 grenade, a 60mm mortar, a 2.36-inch rocket warhead, a 75mm projectile, and a 37mm projectile. Additionally, three non-ferrous test objects will be buried at a depth of 2 inches to 8 inches. A 6-inch length of 1/2-inch reinforcing rod will be placed on the surface for use as a surface check source. Items with greater mass will be buried at greater depths. Each burial location will be marked with a wooden stake located about 6 inches to the north of the object. Each stake will be assigned a reference number and will be tagged or marked to denote the depth, type of item and orientation of the item. The site will utilize native soils; no fill material will be brought in from another area. Sand will be used to cover the area to mitigate the effects of wet weather.

- For downhole magnetometer testing, a length of 2-inch PVC pipe will be buried to a depth of 36 inches. The pipe should be of sufficient length to allow at least another 24 inches to extend above the surface of the ground. A metal object will be buried at a depth of 24 inches and 24 inches from the side of the pipe. The location of the item, similar in size and mass to a 75mm projectile, will be marked with a wooden stake tagged to denote the depth, type of item, orientation, and reference number assigned.

3.2 Magnetometer/Metal Detector Check-Out Procedures

- Prior to field use, all magnetometers and metal detectors will be set up following the guidelines in the manufacturer's operating manual for the specific instrument used. Instrumentation used at this site will include the Schonstedt GA 72, the CST Corporation Magna-Trak 102, or White's Spectrum XLT Metal Detector. Additionally, the Schonstedt MG-220 or

MG-230 will be set up for downhole monitoring. All equipment will be operated in a manner consistent with instructions contained in the appropriate operator's manual. All equipment will be function-tested prior to use. The White's Metal Detector will be used in conjunction with hand-held magnetometers in areas of high concentrations of rocks with a magnetic signature, to assist in eliminating anomalies created by "hot rocks." The operating manual for each of the instruments used at FTMC will be available for use with the equipment.

- Once the instrument has been determined to be working according to the manufacturer's operating manual, the operator will perform a function test on the FTMC geophysical test plot using the detection methods described in the manual. A function test will consist of using the instrument over a minimum of three test sources. The same sources will be used during each function test to ensure consistency. The instrument detection indicator, as described in the operator's manual, will be noted in the instrument logbook. For site checks, a 6-inch length of 1/2-inch steel reinforcing rod will be available to each operator at the work site.

- Instruments that fail to reproduce a detection indication consistent with previous tests will be checked to ensure that the power supply or batteries are sufficient. If the power supply is determined to be sufficient and the operator cannot find a fault in accordance with the operator's manual, the instrument will be tagged and removed from service.

- Function tests will be performed each morning before the equipment is put into service.

- If an instrument is determined to be working improperly, the FTMC UXO Team Leader and the site superintendent will be immediately notified. Any activities performed using that instrument since its last positive test procedure will be considered invalid and will require reevaluation.

- Upon completion of the function test, the "Magnetometer/Metal Detector Functions Test Data Sheet" (Attachment 2) and the equipment logbook will be filled out.

- After an instrument has been function-tested at the beginning of each day, the instrument will be checked at least once during every hour of use or each time the instrument is turned on after having been turned off. This check will consist of dropping the 6-inch length of 1/2-inch reinforcing rod in a clear area and passing the detector over the rod in a manner consistent with the operator's instructions. The instrument indication will be compared to the indication produced during the morning function test. Instruments that fail to produce a consistent indication will be checked and removed from service as required.

3.3 Equipment Documentation

Each piece of equipment will be assigned a logbook noting the make, model, manufacturer, and serial number of the equipment. The logbook and manufacturer's operating manual will be present when the equipment is tested. The following information will be recorded:

- Date and time
- The test plot object used (assigned stake number)
- The reading or indication at each test site
- Whether or not the reading or indication was satisfactory
- The name of the individual performing the test.

The IT FTMC Quality Control (QC) Officer will observe the daily testing of all equipment and will record the results of each test in his field logbook.

3.4 Magnetometer/Metal Detector Field Procedures

All intrusive field actives in potential OE areas (e.g., digging, fence post driving, grading, well installation or excavation) will be preceded by a UXO sweep. Each hole made in areas where OE may potentially be found will have a check immediately over the spot of the intrusion. Magnetometer operations at FTMC will assume a detection depth of one foot when surveying an area for excavation.

All magnetometers and metal detectors will be operated in accordance with the manufacturers specifications and procedures.

When surveying a potential area for a sampling well, an area of sufficient size will be surveyed to allow for installation of required pads and bollards. After the well

is installed, the location of bollards will be adjusted as required if an anomaly is detected during the bollard installation process.

The White's Metal Detector will be used to augment the magnetometers on sites where "hot rocks" are suspected. The purpose of using the metal detector in addition to the magnetometers is to eliminate the probability of "hot rocks."

4.0 FTMC ACCESS CLEARANCES, VEGETATION REMOVAL, AND ROAD MAINTENANCE

This section is designed to provide specific procedures regarding activities associated with the building of access corridors, vegetation removal, and road maintenance in support of FTMC operations.

4.1 Access Corridors

The purpose of access corridors is to enable IT personnel access to well and/or other types of sampling sites within FTMC. Access corridors will be created by marking the route, both length and width, in which a UXO survey has been performed. The marking method will be defined in each site-specific UXO safety plan. No unescorted access is permitted until a corridor has been established. If an anomaly is detected during the survey or during a subsequent excavation, it must be avoided, since investigation is not authorized. The route will be altered to avoid the anomaly for FTMC activities. A magnetometer is considered to reliably detect anomalies to a depth of one foot.

The size of each area to be surveyed is dependent on the type and quantity of equipment expected to be used on that site. The UXO survey crew will follow the procedures outlined in the site-specific UXO safety plan to determine the dimensions of the area to be surveyed. Normally, the width of the access route will be at least twice as wide as the widest vehicle that will use the route; footpaths will be a minimum of 3 feet wide.

Tracked or other vehicles, that disturb the soil are authorized for use only in areas that have been surveyed and no anomalies have been detected.

Erosion and weathering will typically cause some UXO items to leach to the surface or otherwise be uncovered. In cases where access corridors or sampling sites have not been surveyed or traversed for a period of time, additional UXO surveys may be required. The decision regarding the performance of additional

surveys will be made by the FTMC UXO team leader and the IT FTMC UXO Safety Officer. The site superintendent will be notified of this decision. This decision will be based on, but not limited to, such factors as: the amount of time since the last survey was performed; the weather during this period; the terrain in the area of concern; and the type and quantity of UXO found during initial surveys.

4.2 Vegetation Removal

In cases where removal of large trees or other types of vegetation is required, the following procedures will be followed:

- The UXO technician will survey around the base of the tree or vegetation, and, if no anomaly is detected, direct the bulldozer or other equipment to proceed. If an anomaly is detected, the location will be recorded and marked and another route will be selected. The size of the area to be surveyed will depend on the size of the suspected root system of the tree to be removed.

- Once the tree has been pushed over, the UXO technician will survey around the root ball and the area in and around the hole. If an anomaly is detected, the anomaly will be recorded and marked and an alternate route will be selected. If no anomaly is detected, the UXO technician will direct the equipment operator to proceed with the excavation.

4.3 Road Maintenance

Remote range roads and trails frequently require a certain amount of repair to remain passable. This section describes authorized actions regarding the maintenance of dirt or gravel range roads by IT UXO personnel.

- Bulldozers or grader-type equipment is authorized to repair roads and trails as long as a UXO survey has been performed and no anomalies have been detected.

- The UXO technician will observe the blade of the equipment as the earth is moved. If a potential UXO is uncovered, the UXO technician will signal the equipment operator to immediately stop the equipment. The UXO technician will then attempt to visually identify the object. If the object cannot be positively identified as a non-hazardous item, the

equipment will be moved, the location of the object marked and recorded on the IT FTMC Unexploded Ordnance Report Form (Attachment 3), and the route changed to avoid the object. If no suspicious objects are detected, the equipment will continue to move earth at a rate of no more than one foot of depth at a time. If, more grading is required after the first past is complete the UXO technician will perform another survey. If no anomalies are detected, the equipment can repeat the grading process. If an anomaly is detected, the operation will be halted and the route changed.

- After an area has been surveyed and no anomalies have been detected, soil can be removed at a rate of no more than one foot per lift. If additional grading is required, a survey will be performed after each one-foot increment the soil has been removed.

- Earth may not, at any time, be moved at a rate of more than one foot in each lift.

5.0 FTMC UXO LOG BOOKS

All UXO team leaders or UXO technicians supporting HTRW operations will maintain a logbook. The purpose of the logbook is to record UXO actions and activities taken at each work site.

5.1 Responsibilities

UXO personnel will maintain an individual daily logbook of work activities.

The logbooks will be routinely inspected weekly by the UXO QC Officer and will be made available to the FTMC site superintendent upon request. Copies will be made daily and filed in the IT Field Project office.

Logbooks will contain bound and numbered pages. Entries will be on successive pages as work is performed. The individual using the logbook will sign the page after the last entry for that page has been made. Logbooks are part of the project legal file and will be filed with the project files upon completion of each investigation.

5.2 Data Requirements

As a minimum, individual logbooks will contain the following information:

- Date, time and location of UXO activities
- Personnel involved in the activities
- UXO activities performed, including UXO/anomalies found
- A description of areas swept
- A record of the magnetometer or other equipment used, including instrument serial number
- Weather conditions.

The IT FTMC QC Officer will utilize the IT FTMC "UXO Avoidance Quality Control Report" (Attachment 4) to document checks of field activities.

Additionally, UXO personnel will complete IT FTMC Form "UXO Sketch Log" (Attachment 5) and IT FTMC Unexploded Ordnance Report Form. The "UXO Sketch Log" will contain a description of activities, including the dimensions of the area surveyed. A description of the length and width will be recorded, as well as the manner in which the survey was performed. These forms will be completed as required and presented to the site superintendent.

ATTACHMENT 1

FTMC Employee Certification
(Example)

I certify that (name of individual) has fulfilled all UXO orientation requirements and has been observed by me for a period of 3 work days and is therefore eligible to perform UXO activities at FTMC.

_____

Jim Kerr
FTMC UXO Safety Officer

ATTACHMENT 2

Magnetometer/Metal Detector Functions Test Data Sheet

Each magnetometer and/or metal detector will receive a function test at the beginning of each workday and after changing batteries. The function test will include operating the magnetometer/metal detector over a test area developed specifically for ensuring that detection instruments are operating properly. Instruments that do not pass the function test will be tagged out until repairs are made or a replacement instrument is available.

Project Number: _____

Instrument Model: _____

Instrument Serial Number: _____

Date	Person Performing Test	Function Test Results	Remarks

ATTACHMENT 3

Unexploded Ordnance Report Form

Report Tracking Number:

Discovery and Reporting Time

Time of Discovery	
Date	Time

Time Reported to Base Transition Force	
Date	Time

Employee Name:_____

Reported to FTMC Transitional Force Personnel

Name:_____

Location of Ordnance

Location, Description, and Parcel Number:

Coordinates of Ordnance:	State Plane Coordinates	
	Northing	Easting

Picture Taken of Ordnance			
Yes	No	Date	Time

Written Description and/or Sketch of Ordnance:

Corrective Action Taken by Fort McClellan Transition Force

Date	

ATTACHMENT 4

UXO Quality Control Report

Project Location: _____ **Date:** _____

Work Site Location: _____ **Day:** _____

1. **Personnel Involved:**

_____
_____
_____
_____
_____

2. **Description of Work Being Performed:**

_____
_____
_____
_____
_____

3. **Equipment Utilized:**

_____
_____
_____
_____
_____

4. **Comments:**

_____
_____
_____
_____
_____

_____ _____
Completed By **Printed Name & Title**

_____ _____
Signature **Date**

ATTACHMENT 5

UXO Sketch Location Log

District:_____ **Hole Number:**_____ **Date:**_____

Company Name: IT Corporation **Subcontractor:**_____

Parcel Location:_____ Well Location:_____ Date Started:_____ Date Completed:_____

Type of UXO Work Being Performed:

Most Probable Munition:	
Down-Hole Depth Achieved for UXO Avoidance:	
Total Number of Surface UXO Marked:	
Total Number of Anomalies Marked:	

Location Sketch/Comments:	**Not to Scale**
Signature of UXO Technician:	Date: